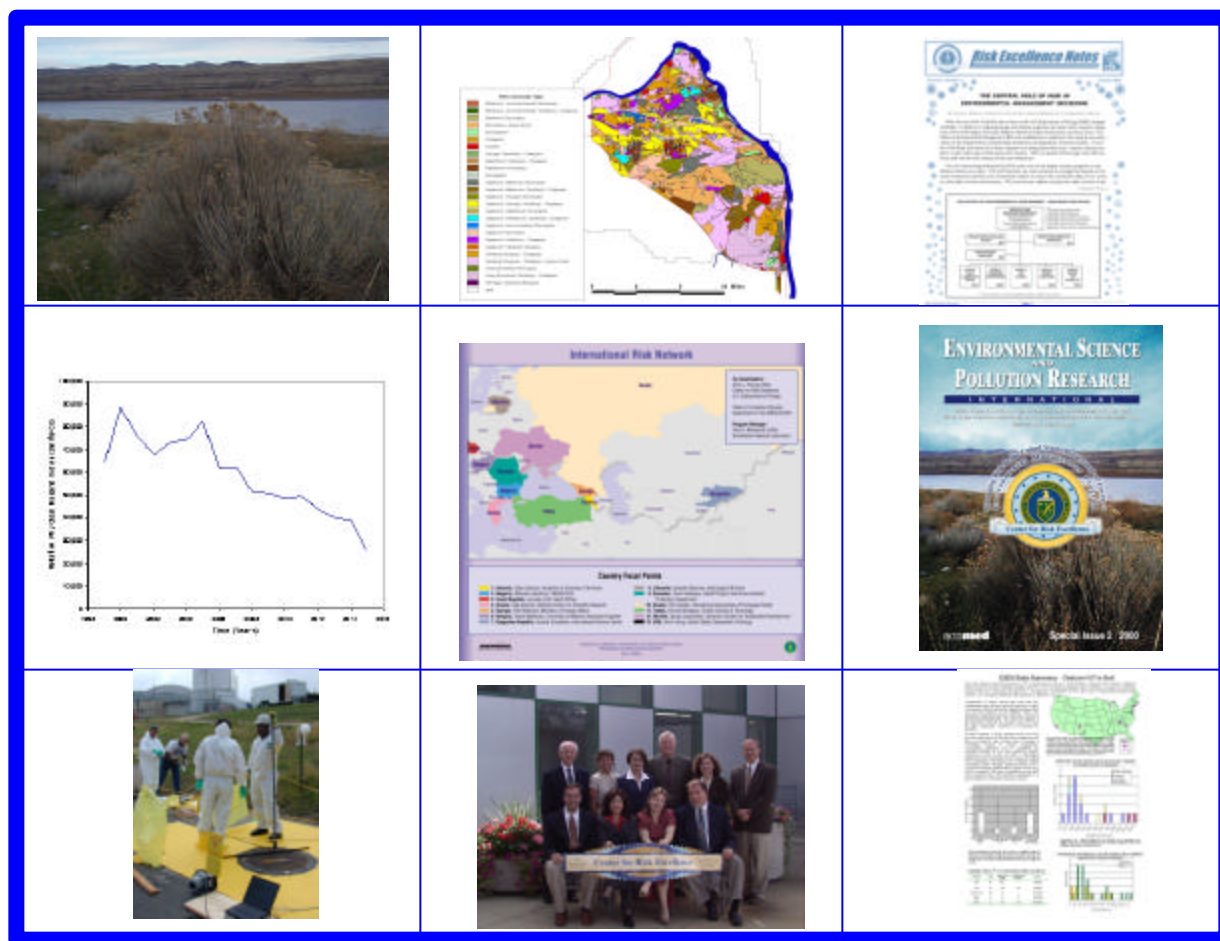


Center for Risk Excellence

FY2001 Accomplishments



Summary Report of CRE Programs and Projects



October 2001

DOE Chicago Operations Office Argonne, IL 60439

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Executive Summary

With the end of FY 2001, the Center for Risk Excellence (CRE) successfully completed its fourth full year of operation. The Center is sponsored by the Chicago Operations Office (CH), the Office of Program and Project Management (CH/PMO), and the Office of Safety, Health and Security (EM-5). Located in Argonne, IL, nine Federal staff members provide technical and managerial oversight to the Center's four complementary programs (see page 11):

- National Risk Program;
- National Peer Review Program;
- Technology Development and Deployment Program for Chicago Sites;
- Cooperative Agreement Institutions that support risk-related research for the Office of Environmental Management (EM).

These complementary programs promote the integration of risk activities for improved (i.e., safer, faster, and cheaper) environmental decisions in support of the Environmental Management Program. This **FY 2001 Accomplishments Report** reflects both the depth and breadth of the Center's Programs and Projects.

The heart of the Center for Risk Excellence is the support it provides to the **National Health and Safety Risk Program**. During FY 2001, the Center received \$1.995 M from the Office of Safety Health and Security (EM-5) and \$885 K from other Headquarters and Field Offices for support of specific projects. In addition, the Chicago's Office of Program and Project Management (CH/PMO) provided \$960 K for support of the Federal staff. The Center's efforts in this program were focused on the development and use of risk assessment, risk management, and risk communication tools within the DOE Complex. Highlights of the fiscal year included:

1. Updating, enhancing and bringing on-line the Cleanup Criteria/Decision Document (C2D2) Database. The database covers 86 installations, 333 sites, and 486 cleanup actions across the complex. Data include cleanup criteria, response actions, and related information for more than 180 contaminants and four environmental media;
2. The preparation of a DOE/Richland (RL) decision support report which is a collaborative effort between DOE RL Operation Office and CRE to explore risk-based approaches to accelerating or refining remediation work scope on the Central Plateau of the Hanford Nuclear Reservation;
3. Integration of risk methodologies and information into the DOE EM Long-term Stewardship Roadmapping effort;
4. Development of a "Plutonium Risk Profile" in partnership with the Office of Nuclear Materials and Spent Fuel (EM-21) and the Savannah River Site;
5. Development of "Risk Management Metrics", in cooperation with the Office for Policy, Planning and Budget (EM-10), that enhance the ability of EM to manage and communicate cleanup progress over time;
6. Initiation of a project to build effective and scientifically-based risk management into EM's decision-making process; and,

7. Continued support for the web-based Risk Assessment Information System (RAIS), a system that provides tools, guidance, risk results and other information necessary for conducting risk-related activities. The RAIS was accessed over 600,000 times during the past year, or a rate of more than 50,000 hits per month.

The National Peer Review Program (\$1.5 M in FY 2001) provides the Office of Science and Technology (EM-50) with uniform, independent, and timely technical reviews of the scientific and engineering merit of technology development activities. During FY 2001, a total of 140 technology projects were peer reviewed, including all requests for proposals. This significant increase in peer reviews was primarily due to the development of a peer review training program, participation in Focus Area bi-weekly calls, preparation of monthly reports, and a revision in the peer review implementation guidance and procedures. The revised guidance document incorporated a revised set of safety and health core, technical peer review criteria.

The Technology Development and Deployment Program (\$7.37 M in FY 2001) provides for the development, demonstration, and deployment of innovative and commercially available technologies with EM line organizations that accelerate clean-up schedules, reduce costs, or otherwise enhance Chicago's program effectiveness. Significant accomplishments in FY 2001 included 11 innovative technology deployments at Brookhaven National Laboratory (BNL) and ten new technologies developed at Argonne National Laboratory (ANL), Ames Laboratory and BNL. Also in FY2001, 13 technology needs were identified for several remediation and decontamination and decommissioning problem areas at ANL and BNL, which present opportunities to reduce life cycle costs by \$40M.

Cooperative Agreement Universities and Institutions (\$4.35 M in FY 2001) provide a wide array of multidisciplinary scientists that assist the Center and the Environmental Management Program in identifying, researching, and communicating solutions regarding environmental health risk issues. The Environmental Biosciences Program (EBP) at the Medical University of South Carolina (MUSC) provides expertise in environmental toxicology, environmental epidemiology and risk assessment, and public policy. In addition to training graduate and post doctoral students, the EBP has a world-class research program investigating the molecular mechanisms of disease pathogenesis and human health effects of trichloroethylene (TCE), polychlorinated biphenyls (PCBs), asbestos, and uranium, to better understand the risks to workers at DOE sites. The MUSC has also developed a comprehensive research program for the study of the effects of low-dose and low-dose rate radiation exposures on human health. The EBP public policy program has assisted DOE with initiatives related to environmental health risks, e.g., environmental justice and the "Living with Risks" video series.

The Environmental Risk Management Alliance (ERMA) is an alliance of six universities and the Argonne National Laboratory. ERMA was established in February 2000 with the goals of providing an independent scientific consortium to

address environmental risk challenges; providing neutral expertise, and state-of-the-art innovation to enhance risk management solutions; and working through partnerships with problem-holders and affected parties to achieve effective sustainable decisions. In FY 2001, ERMA provided expertise to the Center's international program and initiatives in decision-making and stewardship.

The Center's **Outreach Activities** include many efforts by staff and team members to sponsor and participate in communication and education activities. In FY 2001, six issues of **Risk Excellence Notes** were distributed to more than 5000 individuals and organizations both nationally and internationally. Every issue has been posted online at the Center's web site, <http://riskcenter.doe.gov>, which also serves as a valuable resource for tools and information on risk programs, projects and services. In addition, ANL developed 34 Contaminant Fact Sheets for the Center and DOE/RL, providing health-related information for selected contaminants found at many DOE EM Sites. The Center has been active with the Native American Community and the Hispanic Employment Program, with CRE Staff members playing major roles in interacting and leading initiatives. Lastly, the Center for Risk Excellence is keenly aware that the future of Department of Energy's scientific and engineering expertise must be nurtured today. As in previous years, the Center sponsored 17 summer interns with CRE Team Principal Investigators serving as mentors at our national laboratories and operation offices. In May 2001, the Center and ANL sponsored ECO-INFORMA 2001, a conference that attracted more than 200 scientists and engineers from 26 countries to discuss "Environmental Risks and the Global Community: Strategies for Meeting the Challenges." Carolyn Huntoon, former DOE Assistant Secretary for Environmental Management, delivered a keynote address at the conference. Lastly, the Center and its team of risk experts gave and/or published more than 150 publications or presentations during FY 2001.

The Center for Risk Excellence acknowledges the tremendous contributions to the Center from numerous "risk scientists and engineers" at our national laboratories, Headquarters, operations offices, cooperative agreement institutions, and the private sector. We greatly appreciate the financial and administrative support of the Environmental Management Program and the Chicago Operations Office.

Director's Message

RISK CONTINUITY, COMPETENCE & CONSENSUS

As the Center for Risk Excellence completes its fourth year, it's time to examine the value the Center provides. What contribution does the Center for Risk Excellence offer? Our goal is ensure risk information is integrated into effective decisions made by the U.S. Department of Energy (DOE). To do so we must continue what we have begun, be competent at what we do, and aid the cause of consensus in our solutions. Every step of the way we must also be aware of cost. As with any organization, to survive we must meet the tests of **continuity, competency and consensus**. What do we mean by this? How has the Center been effective?

Continuity: Stability and permanence are built one block at a time. What have we begun? Over the past four years, the Center for Risk Excellence has become a resource and a focal point for the risk community, not only within DOE but throughout the nation and overseas. This has been achieved through our efforts to reach the "risk interested" community and the public by means of *Risk Excellence Notes*, the Center's web site (<http://riskcenter.doe.gov>), our sponsorship of national (Waste Management) and international symposia (e.g. Eco-Informa 2001), and our International Risk Assessment Network. A team approach has allowed us to provide the Department, other agencies, and the international community with a full range of risk expertise in a timely manner, uninterrupted, and on a continual basis.

Competency: Key to earning this recognition has been access to expertise from our national laboratories, cooperative agreement institutions, private sector companies, and consultants. It takes a well-rounded team to address the diverse projects of DOE's Environmental Management (EM) sites and headquarters program. The availability of expertise is in itself an issue of concern for the Center. In the United States we have seen the gradual loss of scientific expertise in radiation sciences and risk assessment/management within many of our national laboratories, academic institutions, and federal agencies. Total funding for the Center, for risk-related research, and for the development and maintenance of the academic expertise has been reduced each of the last four fiscal years. This does not portend well for the ability of our Department and other federal and state agencies to gain knowledge and solve technical problems. Our solution has been to leverage monies with other programs and agencies.

Consensus: The issue of "consensus" speaks to the necessity and the willingness of our leadership to reach agreement in a cost effective way by using the tools of risk assessment, management, and communication. Clearly the leadership of our headquarters offices and the operations offices have a vested interest in this process, especially at a time when they must decide how best to expend our limited

resources to obtain site closures and ensure the safety of our adjacent communities. The events of September 11, 2001 will profoundly impact how our communities interpret risks. We have the opportunity as a Department, program and Center to put the risks associated with DOE's environmental cleanup program into perspective. Our success will depend on defining clear and achievable end points for cleanup, finding technical solutions to problems that have never been solved before, and incorporating the varied value systems of the communities surrounding the DOE facilities. To do these things will require that we work together at all levels within the Department, that we have a consensus on what is needed.

A handwritten signature in cursive script that reads "Alvin L. Young". The signature is written in a dark ink and is positioned above the printed name and title.

Alvin L. Young, Ph.D.
Director, Center for Risk Excellence

About CRE

The DOE Center for Risk Excellence (CRE), located in the DOE Chicago Operations Office, is sponsored by the Office of Safety, Health and Security (EM-5). The CRE was established in 1997 to serve as a catalyst for improved environmental decisions through sound risk assessment, management, and communication. It supports both Field and Headquarters' organizational units.

As illustrated in the figure, other key participants in the National Risk Program include the DOE Operations/Field Offices, including the Board of Directors for the CRE; DOE National Laboratories; Grant and Cooperative Agreement institutions, Management and Integration Contractors; and technical experts from academic and research organizations and the private sector. As the EM lead for risk, the CRE has a principal responsibility for facilitating participation and interactions among these entities to address the risk component of DOE's environmental quality goals. This responsibility includes coordinating multiple activities of the National Risk Program, as summarized in this report.



Relationships between the National Risk Program and Other Programs and Organizations

Center for Risk Excellence Support Team

AMES Laboratory: Martin Edelson*

Argonne National Laboratory (ANL): Margaret MacDonell*, Loren Habegger, John Peterson, Jim Butler, Deborah Elcock, Elizabeth Hocking, Fred Monette, S.Y. Chen

Brookhaven National Laboratory (BNL): Paul Moskowitz*, Ludmila Shelenkova, Terry Sullivan

Desert Research Institute (DRI): Bruce Church*

Environmental Measurements Laboratory (EML): Gladys Klemic, Paul Bailey

Institute for Regulatory Science (RSI): Alan Moghissi*, Betty Love

International Institute for Indigenous Resource Management (IIIRM): Merv Tano*, Jeanne Rubin

International Risk Assessment Network (IRN): James Droppo*, Vitaly Eremenko

National Environmental Technology Laboratory (NETL): Lou Borghi* (SAIC), Curtis Travis* (PPC)

Oak Ridge National Laboratory: Wilson McGinn*, Po-Yung Lu

Pacific Northwest National Laboratory (PNNL): William Andrews*, Robert Stenner, David Seaver

Risk Excellence Notes (REN) Newsletter: Nancy Lane (Lane Environmental Inc)

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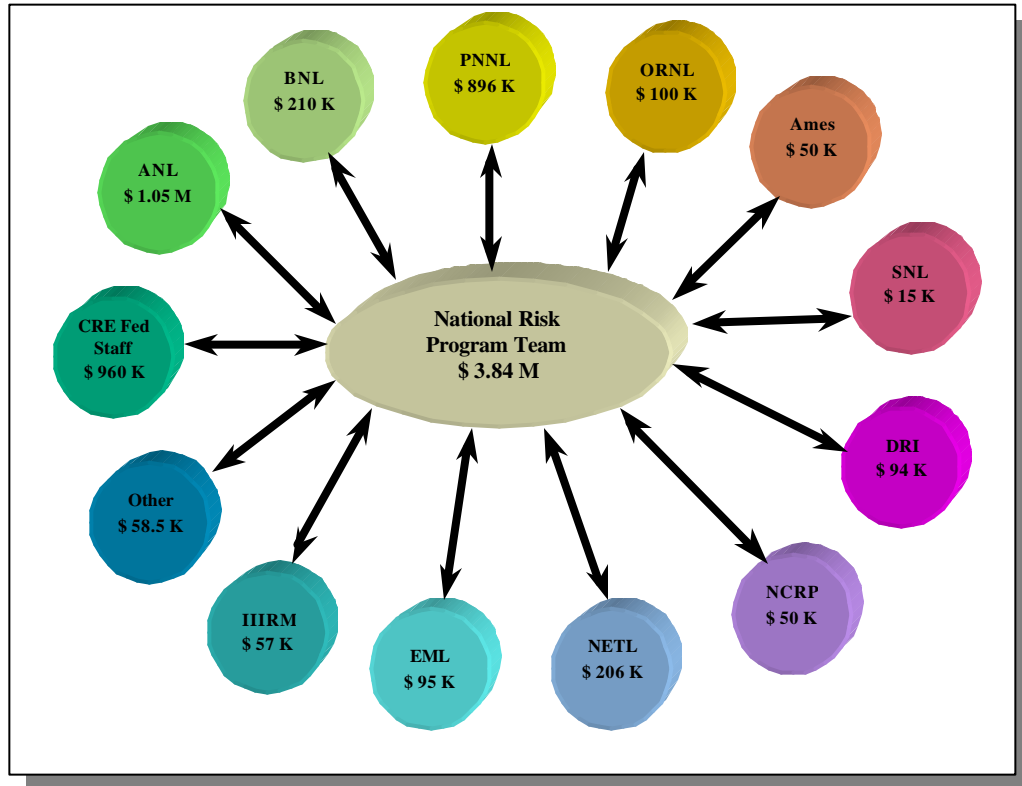
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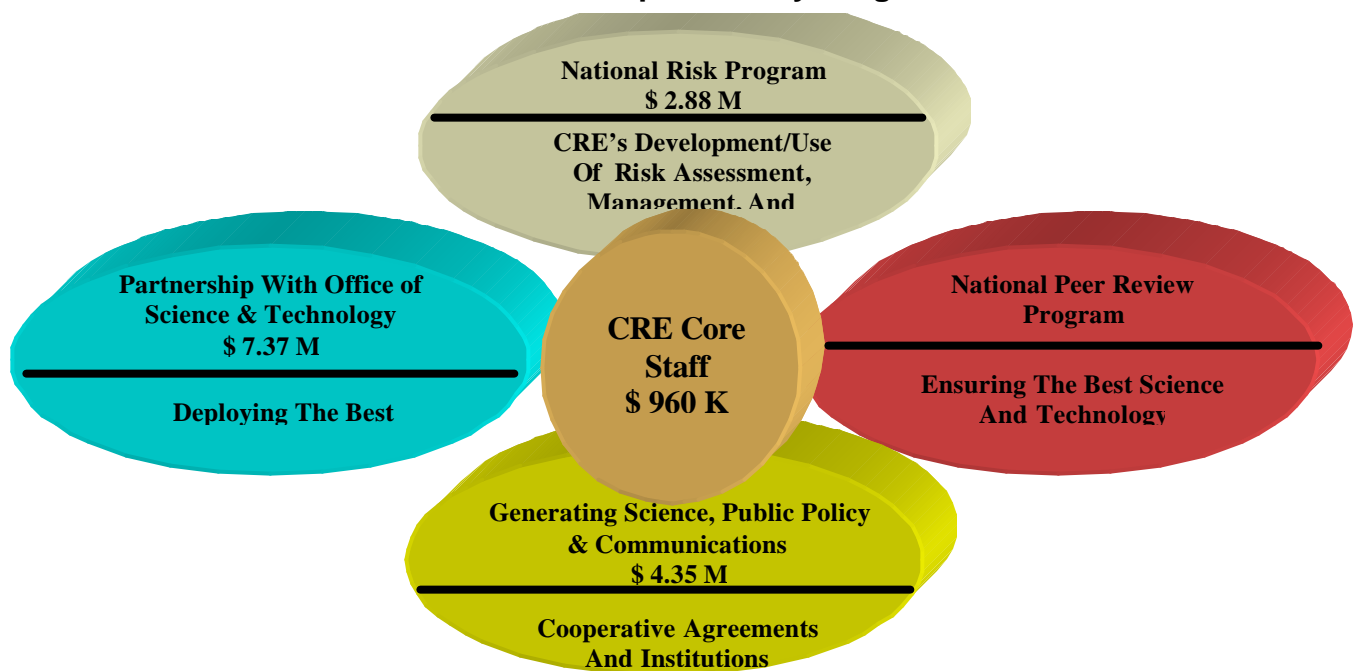
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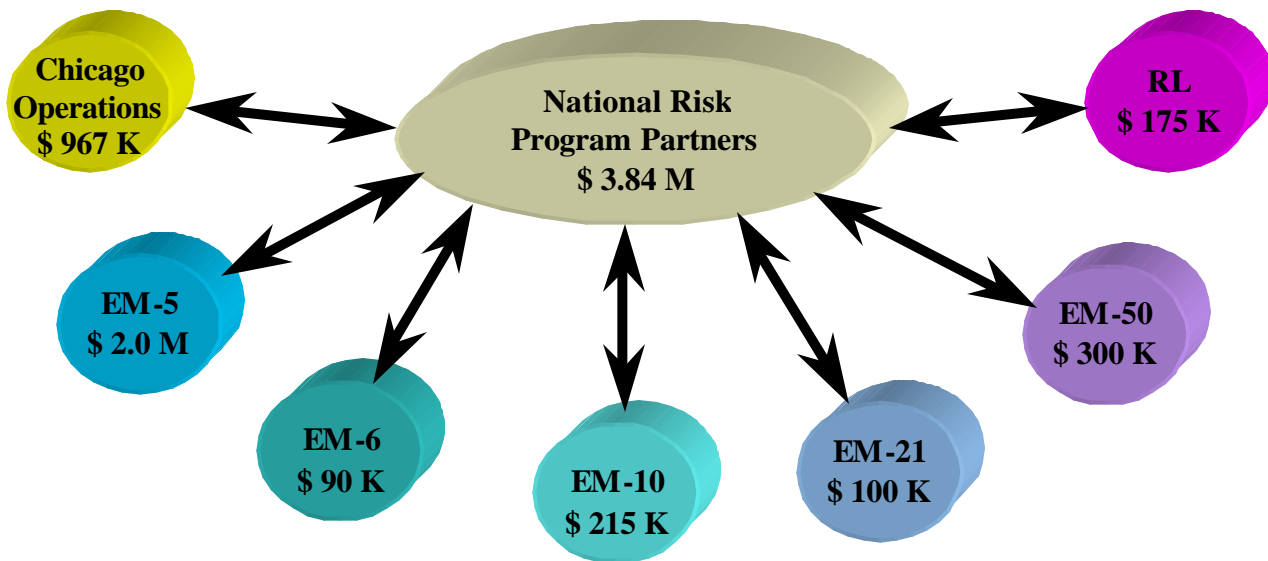
Funding

In order to maintain a true Center of Excellence, the CRE works in partnership with the most qualified individuals from throughout the DOE complex and beyond.



The CRE's Complementary Programs

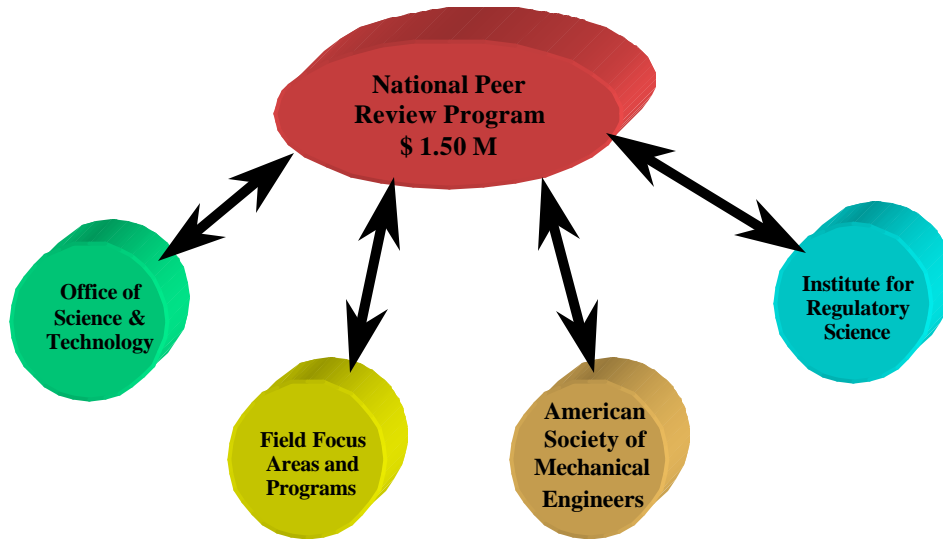




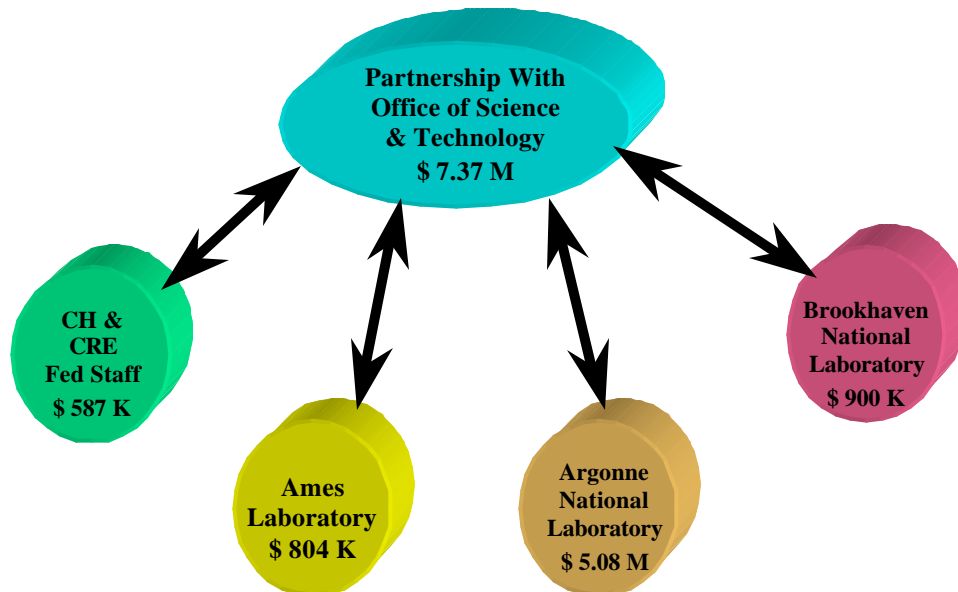
During FY2001 the CRE was able to leverage it's resources for the National Risk Program to secure project specific funding from a number of sources. That funding is then distributed to a number of experts throughout the country to access the expertise necessary for a Center of Excellence.



The National Peer Review Program primarily utilizes it's funding to support the work of the Institute for Regulatory Science and the American Society of Mechanical Engineers.



Our support to the Office of Science and Technology includes managing the OST funding distributed to DOE CH National Laboratories in support of the Technology Development and Deployment Program.



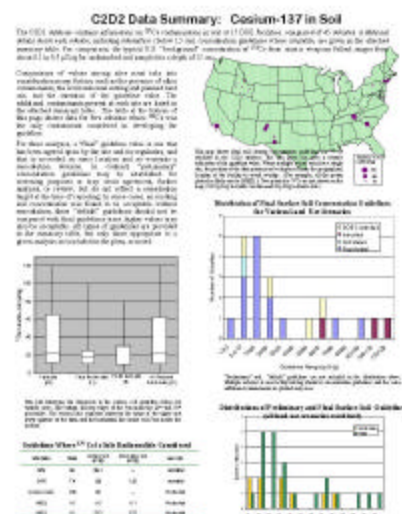
Major Areas of Responsibility

Support for the National Risk Program

Cleanup Criteria/Decision Document (C2D2) Database

The Center for Risk Excellence continued to add data and update the C2D2 database. Several demonstrations of the database were presented and a Technical Report has been prepared for distribution (DOE-CH-CRE-5-2001).

- New website developed and placed on the Internet (broad access targeted for October), making updated C2D2 data readily accessible by Field and Headquarters staff. This new website has the following attributes:
 - *More sites than the previous website.* Database covers 86 installations, 333 sites, and 486 cleanup actions across the complex. (The earlier website covered 82 installations, 291 sites, and 389 cleanup actions.) Data include cleanup criteria, response actions, and related information for more than 180 contaminants and 4 environmental media.
 - *Improved data quality.* Data have been upgraded through more rigorous quality assurance/quality control procedures, and clarifying fields and comments have been added to provide further context information.
 - *Graphical capabilities.* With the new site, users can compare cleanup criteria across the complex and search for and view information on specific medium/contaminant combinations. Several illustrative graphics have been prepared. The website continues to be enhanced to respond to user needs.
- C2D2data have been and continue to be updated as new information becomes available. (This year, data were added for 1 new installation, 13 sites, and 45 subsites.)
- Demonstrations and briefings have been given for DOE-Headquarters personnel.
- In response to site-specific requests, database queries have been conducted to generate reports for individual radionuclides to inform site cleanup level determinations.

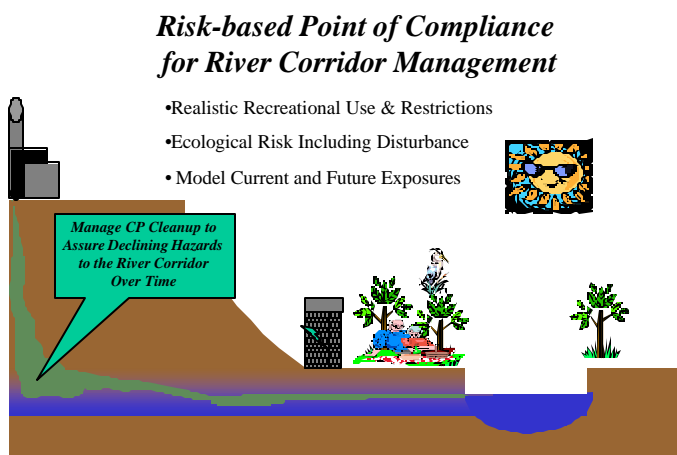


Primary CRE Team Participants: Gladys Klemic, Environmental Measurements Laboratory and Deborah Elcock, Argonne National Laboratory

Richland Decision Matrix

This work in support of DOE-RL is focused on identifying management opportunities that could be exploited to streamline Plateau source control and contaminant management endpoints and establish release limits for waste management operations without adverse impacts to the River Corridor or reuse of other portions of the Hanford site. The approach identifies Plateau decisions and how they can be integrated with other portions of the site to address both groundwater and long-term residual risk management. Preliminary information indicates that this approach to the Plateau could have significant benefits in terms of reduced cost and supporting inclusion of groundwater remedies and long term issues in the strategy.

Current site information was used to develop specific examples on the potential effectiveness of barriers source control and buffer zones for groundwater contaminants. Current monitoring and modeling results indicate that the risk from potential exposure to contaminated groundwater is declining and that the mobility of contaminants remaining in the vadose zone may also be declining.



- Collaborative effort between RL and CRE to explore risk-based approaches to accelerating or refining remediation work scope on the Central Plateau
- PNNL is leading this effort for the CRE
- Key aspects of the current remediation program is that they do not explicitly deal with potential long term aspects of tank closure or material in the vadose

zone from past releases

- Integration of the Plateau strategy with groundwater resolutions has the potential for multi-billion dollar savings to the site program

Primary CRE Team Participants: William Andrews, Pacific Northwest National Laboratory, Mark Bollinger, CRE

Long Term Stewardship

The Center for Risk Excellence has led the effort to understand the risk implications of moving the EM program from active remediation to longer term stewardship. Current efforts include a comprehensive planning project with the DOE Chicago

Operations Office and its' laboratories to begin transitioning to stewardship and to pilot significant cost and efficiency improvements to stewardship and monitoring programs which will be applicable throughout the complex.

Integration of Risk Methodologies and Information into the DOE EM Long-Term Stewardship Roadmapping Effort

The primary objective of this ongoing program is to facilitate use of advanced risk methodologies and information in the development of a science and technology (S&T) roadmap for the DOE EM long-term stewardship (LTS) program. This project is closely coordinated with the overall LTS roadmapping effort under the direction of Idaho National Engineering and Environmental Laboratory.

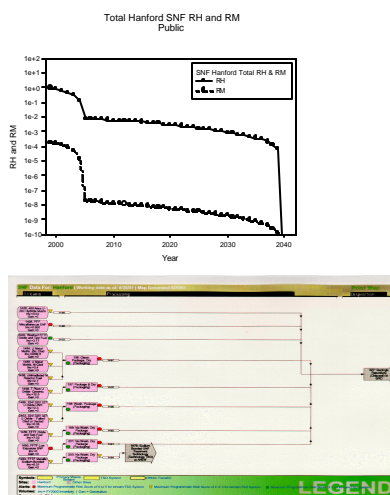
In the accomplishments to date, the general frameworks for use of risk in roadmap decision-making were structured to encompass the three basic components of an LTS system: (i) site/setting characterization, (ii) engineering measures, and (iii) administrative systems. The framework translates the uncertainties and vulnerabilities for each of these into S&T needs (e.g., S&T need to deal with vulnerability of the site to fires) in terms of four cross-cutting elements: monitoring/sensors/sampling-analysis; risk assessment; risk management/contingency; and information management, communication/dissemination and social processes. The approach to the overall program was presented and input solicited at the long-term stewardship workshop in Grand Junction, CO (July 30 – August 2, 2001) and at the Argonne workshop on DOE/EM decision making (August 29-30, 2001). In addition to CRE and Argonne staff, the Environmental Risk Management Alliance (ERMA) team, and other participants in the workshop mentioned under the status report for the companion project, are assisting with the ongoing project efforts.

Primary CRE Team Participants: Mark Bollinger, CRE; Jack Ditmars, Larry Moos, Margaret MacDonell and Loren Habegger, ANL

Risk Management Metrics

In support of the Office for Policy, Planning, and Budget (EM-10), the Center for Risk Excellence (CRE) has developed new approaches to hazard and risk management that use semi-quantitative methods to describe the relative hazards and risks at sites within the DOE Complex. These measures consider the physical form,

RH and RM for Hanford SNF



Base Prefix	Field ID	PBS #	PBS Type	Start	End	Stream Description
1484	RL	SNF-01A	RS03	Dispositions	201	2042 Mixed Matrix, Zr, Clad
1484	RL	SNF-01A	RS03	Inventory	199	2003 Mixed Matrix, Zr, Clad
1484	RL	SNF-01B	RS03	Dispositions	201	2003 Mixed Matrix, Al, Clad
1484	RL	SNF-01B	RS03	Inventory	199	2003 Mixed Matrix, Al, Clad
1484	RL	SNF-01C	RS03	Dispositions	201	2003 Unirradiated H Reactor Fuel
1484	RL	SNF-01C	RS03	Inventory	199	2003 Unirradiated H Reactor Fuel
1484	RL	SNF-01D	RS03	Dispositions	201	2003 Unirradiated H Reactor Fuel
1484	RL	SNF-01D	RS03	Inventory	199	2003 Unirradiated H Reactor Fuel
1484	RL	SNF-02	RS03	Dispositions	201	2003 Dry K Reactor Fuel
1484	RL	SNF-02	RS03	Inventory	201	2003 Dry K Reactor Fuel
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1484	RL	SNF-19	RS03	Dispositions	201	2003 Unirradiated H Reactor Fuel
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1484	RL	SNF-20	RS03	Dispositions	201	2003 Unirradiated H Reactor Fuel
1484	RL	SNF-20	RS03	Inventory	199	2003 Unirradiated H Reactor Fuel

management, environmental behavior and potential operational/accident scenarios that could release hazardous substances to the environment. The measures also consider the volume and radioactive and toxic aspects of the substances in question.

The relative hazard measures generated by this analysis serve as metrics that communicate progress over time in the mitigation of these hazards. They can communicate the importance of long-term and costly activities in the EM program. In addition to providing the methodology and analysis, the CRE will assist EM10 with the incorporation of these metrics into the budget process.

In FY-2001, the focus was on working with the Integrated Planning and Budgeting System (IPABS) to locate necessary input data and develop a mapping path to collect the data from the various sections and formats within the IPABS. Also, the system was automated, with an ACCESS database developed to hold the necessary input data and information. Also, preliminary prototype relative hazard and risk measure profiles were developed for SNF and HLW at Hanford and Savannah River Site. In addition, the initial design of a web-based system to display input parameter information and output results for the prototype profiles was completed.

Primary CRE Team Participants: William Andrews and Robert Stenner, Pacific Northwest National Laboratory; Mark Bollinger, CRE

Nuclear Materials Stewardship

The Center for Risk Excellence developed a demonstration “Plutonium Risk Profile” in partnership with the Office of Nuclear Materials and Spent Fuel (EM-21) and Savannah River Operations. The Risk Profile will help EM-21 and the complex-wide, Plutonium Materials Management Group (located at Savannah River) understand how to prioritize Pu treatment, storage, and other handling activities. Most importantly, the tool will be used to ensure that DOE’s most hazardous materials are targeted for swift attention. Additionally, the profile will enable DOE to explicitly illustrate (through concise graphics) how health risks to workers and the public will be mitigated as management activities proceed.

In addition to the risk profile, in FY2001, the Center for Risk Excellence and EM-21 collaborated on a number of strategic planning documents including EM-21’s cross-Program, complex wide Nuclear Materials Stewardship Initiative (NMSI) and the Integrated Nuclear Materials Management Plan (INMMP). The CRE has also begun to support other Nuclear Material Management Groups (e.g., Uranium, Heavy Isotopes, Spent Nuclear Fuel, and Non-Actinide Isotopes and Sealed Sources) to determine how best they can consider human health risk as their programs evolve. Through these and similar efforts, the Department will be able to continually enhance the way it uses risk to plan and communicate its programs.

Primary CRE Team Participants: Lou Borghi, Science Applications International Corporation; William Andrews, Pacific Northwest National Laboratory; Peter Siebach, CRE

Environmental Risk Colloquium

The Environmental Assessments Division, Argonne National Laboratory organized an environmental risk colloquium titled “Risk Based Strategies for Environmental Decisions” on March 29, 2001, at which nine speakers (including CRE Director Young and scientists from EPA Region 5, Menzie-Cura & Associates, URS Corporation, ANL, and TCU) made presentations on a variety of current risk issues, with recommendations for improvement. A featured guest was Ivan Holoubek, professor of environmental chemistry and Director of the Research Center on Ecotoxicology at Masaryk University, Brno, Czech Republic.

Primary CRE Team Participants: Margaret MacDonell and Loren Habegger, Argonne National Laboratory

Quality of Life Methodology Development

The goal of the Quality of Life Methodology Development project is the establishment of an American Society for Testing and Materials (ASTM) standard to identify and measure a wide range of risks that impact a community’s quality of life. This is a multi-agency approach, including tribes, nonprofit organizations, federal agencies, and other stakeholders, in developing a quality of life framework and drafting a quality of life process standard. Specific accomplishments during FY2001 included:

- Quality of Life risk assessment framework drafted as a tool to identify, characterize, and measure human health, ecological, economic, and socio-cultural risk indicators.
- Multi-agency approach, including federal agencies, tribes, rural and urban communities, and other stakeholders.
- Quality of Life framework attempts to measure both the negative impacts as well as the positive benefits that encompass a DOE or other cleanup site.
- Addresses environmental justice issues that impact low-income and minority populations through consensus building and community involvement and participation.
- CRE co-sponsored a Quality of Life Meeting at the EPA, Region 8, in Denver with a variety of stakeholders to discuss the development of this framework (approximately 40 participants).

Primary CRE Team Participants: Robert Stenner, Pacific Northwest National Laboratory; Elizabeth Hocking, ANL; Wilson McGinn, ORNL; and Larry Lapachin, CRE

Project Risk Management

The Office of Project Management (EM-6) was established in 1999 to help the Office of Environmental Management (EM) improve project management performance. It is too early to measure the influence of EM-6 on the long term success of the EM mission; however much has been done to develop the infrastructure and competency that EM needs to achieve success with its projects. EM-6 has begun to partner with the Center for Risk Excellence (CRE) to address “project risk” using an approach similar to risk management as it applies to safety-- that is, to help EM identify and analyze cost and schedule uncertainties.

“Project risk” and/or “Programmatic risk” are natural extensions of the Center's mission (which to-date has focussed primarily on human health risk) for two reasons:

1. Human health protection requires a high confidence in the risk aversion techniques to assure worker safety. Similarly, EM projects are extremely costly due to the character of the material to be managed. As a result, albeit for slightly different reasons, both areas require precise identification and mitigation of situations, processes or procedures that increase risk or where risk is inherent. Both areas also require that the respective risks be managed not “accepted”.
2. Whether one is assessing potential cost and schedule or human health impacts, the concepts of probability and consequence do not change. For instance, Monte Carlo simulations are applied in both human health and project risk analyses.

In FY 2001, the Center (and contractor Pacific Northwest National Laboratory) assisted EM-6 on three Internal Independent (Project) Reviews: Pantex Site Environmental Restoration Project, Nevada Operations Underground Test Area Project, and the Oak Ridge Solid Waste Storage Area 4 Burial Ground Project. It also provided two subject matter experts who participated in a Savannah River Site Salt Processing Project risk assessment. In addition, it provided extensive comments on a project risk assessment for the Pit Disassembly & Conversion Facility for the National Nuclear Security Administration.

In the first quarter of Fiscal Year 2002, EM-6 and the CRE are planning to convene a workshop on project risk in Albuquerque, NM. The goal is to continue to elevate EM project management performance, specifically through the application of proven risk management principles, processes and techniques. Additional Independent Internal Reviews and site assistance are also planned.

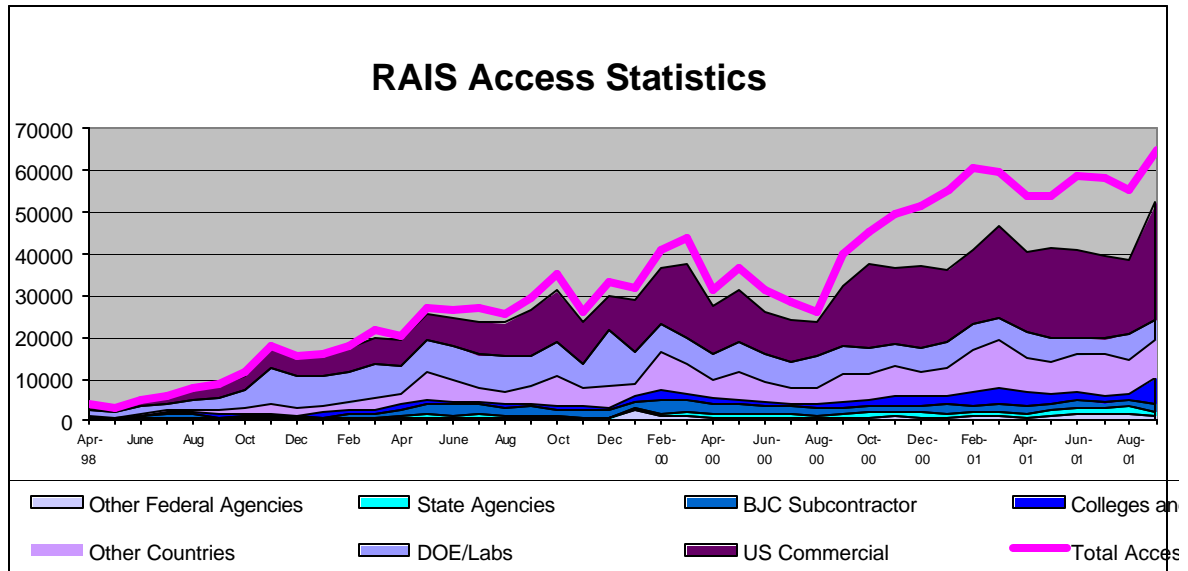
Primary CRE Team Participants: David Seaver, Pacific Northwest National Laboratory; Peter Siebach, CRE

Risk Assessment Information System

The web-based Risk Assessment Information System provides tools, guidance, risk results, and other information necessary for conducting risk-risk related activities. In addition, this system provides the latest risk guidance and directs the uses to specific EPA and State guidance necessary for performing risk assessment activities within the CERCLA process.

In FY2001, continued general maintenance and update activities for the Risk Assessment Information System were performed. This task included updates and QA/QC for toxicity values, toxicity profiles, preliminary remediation goals and risk equations. In addition user support activities provided on-line help on an as-needed basis. The RAIS was assessed over 666,000 times during the past year at a rate of 55,500 hits per month. DOE use stayed level with approximately 7,000 hits/month. The most significant increases where from users in the commercial sector and from other countries.

The Center for Risk Excellence and its partners also competed the first phase of the addition of a Worker Exposure Module to the RAIS. This is the first step toward developing an online worker risk tool in support of ISM objectives. This module provides links for exposure information for screening purposes and equations to calculate worker risk. The objectives of a worker risk system are to provide an online repository for resources and applications, as well as the comprehension to identify and address critical data gaps in methods and science needed to improve the assessment process. Specifically, it will provide databases, tools and models enabling the consistent analysis of worker risks associated with exposures and accidents as a result of the implementation of remediation, waste management, or surveillance and maintenance activities.



Primary CRE Team Participants: Wilson McGinn, Oak Ridge National Laboratory

Building Effective and Scientifically Based Risk Management into EM's Decision-Making Process

Historically, DOE's clean-up decisions/orders have appropriately been based not only on human health risk, but also on environmental risk, cultural risk, stakeholder concerns, political concerns, and costs. However, in many cases, the balance among these criteria has been skewed from sound science/quantitative risk information to more subjective desires and perceptions. The result has been that clean-up costs were (and are still being) driven up.

In that regard the DOE Center for Risk Excellence, with the support of the Argonne National Laboratory, was given the task to investigate how approaches based on risk assessment and management principles could be utilized more effectively in site cleanup decisions. Strategies that include both technical methods and human processes were investigated. The accomplishments through the end of FY 2001 included:

- Conducted a workshop at Argonne (August 29-30, 2001) with over 30 participants included members of the Environmental Risk Management Alliance (ERMA) and other recognized experts from academia, industry, government, and national laboratories. Presentations and case study breakout sessions framed discussions of how EM's decision-making process could be improved.



- Three drafts of related case studies have been compiled; additional case studies are under way.
- An Access database of risk-based tools has been designed and information collection initiated.

Primary CRE Team Participants: Margaret MacDonell and Loren Habegger, Argonne National Laboratory; and Peter Siebach, CRE

Risk Training

The Department of Energy (DOE) Office of Environmental Management's (EM's) Environmental Training Partnership (ETP) identified and validated "Risk Assessment, Management, and Communication" as a critical training need for EM staff. The topic was placed on the ETP's priority list, and the Center for Risk Excellence (CRE) was assigned the responsibility to assess training needs, identify and evaluate existing training, and make recommendations for course development where gaps in training exist. The Center pursued the identification of risk training needs through four separate mechanisms:

- Examination of Center for Risk Excellence planning documents,
- Professional judgement of subject matter experts,
- Recent requests from those requiring training, and
- A "training needs survey" distributed to key Environmental Management Office Directors.
- Examination of Center for Risk Excellence planning documents,
- Professional judgement of subject matter experts,
- Recent requests from those requiring training, and

- A “training needs survey” distributed to key Environmental Management Office Directors.

A resulting training plan report has been completed and is awaiting posting on the CRE’s web site. In addition to course recommendations, the plan contains appendices listing and providing contact information on currently available (Government and commercial) risk related training. One of the courses recommended in the plan (Practical Risk Communication) and listed in an appendix was offered by the Center in August 2001. It received one of the most favorable participant evaluations in EM history. Training efforts in FY 2002 will focus on additional offerings of this course as well as a continued focus on CERCLA and RCRA clean-up.

Primary CRE Team Participants: Peter Siebach and Larry Lapachin, CRE; Margaret MacDonell and Fred Monette, Argonne National Laboratory

Database of Environmental Parameters, Organizations and Tools (DEPOT)

The Database of Environmental Parameters, Organizations, and Tools (DEPOT) has been developed as a central warehouse for access to data essential for environmental risk assessment analyses. Initial efforts have concentrated on groundwater and vadose zone transport data and bioaccumulation factors. DEPOT seeks to provide a source of referenced data that, wherever possible, includes the level of uncertainty associated with these parameters. Based on the amount of data available for a particular parameter, uncertainty is expressed as a standard deviation or a distribution function.

DEPOT also provides DOE site-specific performance assessment data, pathway-specific transport data, and links to environmental regulations, disposal site waste acceptance criteria, other environmental parameter databases, and environmental risk assessment models. The web site address is <http://www.prod.sandia.gov/depot>.

- The database has been expanded to ~3000 entries for bioaccumulation factors and ~12,000 entries for distribution coefficients. These data are expected to be available on the web



- site by the end of October.
- The data entry system has been upgraded to allow multiple data analysts to enter data simultaneously.
- Efforts are currently underway to provide the user with statistical analyses of distribution coefficient data by element and soil types.
- The project has continued to utilize student interns. Two interns were supported this year, one by the CRE.

Primary CRE Team Participants: Regina Hunter, Sandia National Laboratories – New Mexico

National Council on Radiation Protection and Measurements

In the United States, the U.S. Department of Energy and the U.S. Nuclear Regulatory Agency have primary responsibility for regulating the design, construction, operation, and decommissioning of nuclear facilities, including commercial nuclear power plants, uranium fuel cycle facilities, federal facilities supporting the nations nuclear weapons program, nuclear research reactors, medical facilities, and other facilities handling nuclear materials. Within the next few decades, several hundred thousand tons of metal is expected to be removed from nuclear facilities across the DOE complex as a result of decontamination and decommissioning activities.

Although much of this material does not, some contains above-background concentrations of residual radioactive material. In many cases, property containing or potentially containing above background concentrations of residual radioactive material has been disposed of by burial, however, some of the property may have value and the incentive to recover/recycle them is high.

DOE has developed procedures for recovery/recycle and these are contained in DOE Order 5400.5, *Radiation Protection of the Public and the Environment*. However, these procedures have created controversy among members of the public. As a result, DOE is revisiting the Order and has commenced preparation of an Environmental Impact Statement. To help provide a technical information for these and other processes, the Center for Risk Excellence entered into a grant agreement with the National Council for Radiation Protection and Measurements to prepare a technical report. Work on the report continued throughout FY 2001 and is expected to be completed in FY 2002.

Primary CRE Team Participants: S.Y. Chen, Argonne National Laboratory

FY02 Goals

Project Title: Risk-based Performance Metrics *Participating Partners: EM-10*

Project Summary: The Center has been working with EM-10 to develop risk-based performance metrics that can be used to support EM decision-making and budget development discussions. Significant progress has been made in method development; however, transition to an easily accessible decision-making and communications tools is now required.

Project Title: Risk-based Waste Type Performance Metrics *Participating Partners: EM-20*

Project Summary: The Center has been working with EM-20 to utilize risk-based performance metrics to support EM waste type decision-making and budget development discussions. Significant progress has been made in analyzing spent nuclear fuel at major facilities; however, the tool must now be applied to more waste types and additional sites in order to be able to access/discuss overall performance.

Project Title: Cleanup Criteria Decision Document (C2D2) database *Participating Partners: EM-30*

Project Summary: The Center has made significant progress with EM-30 to enter new ROD data, to QA existing data, and to develop decision support tools from the data.

Project Title: Risk-Related Training Courses *Participating Partners: NN-30 (has expressed interest in Risk Communication course to be delivered at HQ).*

Project Summary: Survey and analysis performed indicate risk assessment, management, and communication are in top 10 of EM training priorities. CRE has provided Risk Communication training, on demand risk assessment primer, and continues to manage and internship program.

Project Title: EM Site Assistance *Participating Partners: Field Offices*

Project Summary: The Center is frequently requested to support specific risk-related projects at Field/Operations Offices and at HQ. Most often these needs arise on a short lead time and require quick response.

Project Title: Risk Assessment Information System (RAIS) *Participating Partners: DOE-Oak Ridge, EPA*

Project Summary: The RAIS is a web-based system which provides tools, guidance, and on-line analysis necessary for conducting preliminary risk assessments. The system provides the latest guidance necessary for developing and performing baseline risk assessments under the CERCLA process. Monthly use has reached 50,000 uses per month.

Project Title: NCRP analyses *Participating Partners: NCRP*

Project Summary: The Center has partially fund past efforts by NCRP to develop independent reports on critical issues to EM.

Project Title: International Risk Assessment Network Participating Partners: NATO and EM-5

Project Summary: The Center has participated in efforts to initiate the Network and continues to solicit NATO support. The Network involves 12 former Soviet Republics, other eastern European countries, and the U.S. in efforts to share risk assessment, management and communication tools and information.

Project Title: Programmatic Risk Assessment Participating Partners: DOE Rocky Flats, EM-6

Project Summary: At the encouragement of it's Field Office and HQ customers, the Center for Risk Excellence has maintained a small effort to support the use of programmatic risk as a critical tool for the completion of the EM mission. The Center has worked with DOE Rocky Flats in the past to create position documents on the EM-wide use of programmatic risk and more recently has worked with EM-6 to support project risk assessment work. Funding for this project would legitimize the program and allow the Center to fully support EM-wide integration of programmatic risk efforts in order to identify, quantify, and plan for risks to EM completion.

Science Support to EM

Medical University of South Carolina

The Environmental Biosciences Program (EBP) is an integrated, multidisciplinary scientific program, employing a range of research initiatives to identify, study and resolve environmental health risk issues. These initiatives are consistent with the Medical University's role as a comprehensive state-supported health sciences institution and the nation's need for new and better approaches to the solution of a complex and expansive array of environment-related health problems. The intrinsic capabilities of a comprehensive health sciences institution enable the Medical University to be a national resource for the scientific investigation of environmental health issues.



Environmental Toxicology

MUSC continues to see results from its comprehensive research program on the molecular mechanisms of disease pathogenesis and the human health effects of TCE, PCBs, asbestos and uranium to understand better the risks to workers at DOE sites. Through this research program, MUSC helps to ensure that environmental risk assessment and remediation activities are **based upon sound science**.

Environmental Epidemiology and Risk Assessment

The adverse health effects of both ionizing and non-ionizing radiation are of concern to DOE and the public. Many important questions about the adverse human health effects of low-dose and low-dose rate radiation exposures remain unanswered – especially with respect to cancer risks. MUSC has developed a comprehensive research program for the study of the effects of low-dose and low-dose rate radiation exposures on human health.

Public Policy

The Public Policy section develops and coordinates special multidisciplinary projects that directly assist the DOE/CRE in the planning, development, communication and implementation of public policy initiatives related to environmental health risks. These projects are formulated, coordinated and implemented in partnership with the DOE/CRE to insure maximum benefit and “value added” for the DOE/CRE.

All EBP projects are closely integrated with the graduate level and post-doctoral educational activities of MUSC. EBP graduate students and post-doctoral fellows are integral members of the scientific research teams and conduct their dissertation and post-doctoral research through the projects. This is one of the most important

aspects of the program. The MUSC Environmental Biosciences supported 8 Ph.D. level graduate students in FY 2001. MUSC plans to support 12 Ph.D. level graduate students and at least two post-doctoral fellows in FY2002.

More detailed reports on the accomplishments of MUSC during FY2001 are available from the Center for Risk Excellence or directly from MUSC. All MUSC publications are listed in the Publications section of this document.

Primary CRE Team Participants: Lawrence Mohr, Medical University of South Carolina

Environmental Risk Management Alliance

The Environmental Risk Management Alliance (ERMA) is a university-based consortium organized to support the Department of Energy's Office of Environmental Management. Member universities include Carnegie-Mellon, Colorado State, Harvard, Purdue, New Mexico, and Virginia. Argonne National Laboratory serves as an interface to the DOE and provides the associate director of the group. During FY2001 ERMA provided invaluable support to the Center for Risk Excellence by providing experts to evaluate the document "Final Report of the ATRP-R Project Environmental Security Implications of Decommissioned Russian Nuclear



Submarines, Including Dismantlement: Feasibility Study." The evaluation examined the feasibility of conducting an environmental assessment of decommissioned Russian nuclear submarines, including issues related to dismantlement and the technical merit of the material presented. See more about the review below.

In addition, ERMA played a pivotal role by participating in a workshop at Argonne (August 29-30, 2001) with other recognized experts from academia, industry, government, and national laboratories. Presentations and case study breakout sessions framed discussions of how EM's decision-making process could be improved. See more about this effort in the decision-making section above.

Primary CRE Team Participants: Paul Ziemer, Purdue; Loren Habegger and Margaret MacDonell, Argonne National Laboratory

National Peer Review Program

The objective of The National Peer Review Program is to provide Office of Science and Technology (OST) decision makers with uniform, independent, and unimpeachable technical reviews, on a timely basis, to assess the scientific and engineering merit of OST technology development activities.

During FY 2001, the Peer Review Program improved dramatically. During its inception and throughout the life of the program, an average of 32 technologies were peer reviewed every year. A total of 140 technologies were peer reviewed during FY 2001. This dramatic change is due to several improvements made to the program including the development of a peer review training; development of a peer review training videotape; participation in Focus Area (FA) bi-weekly calls; preparation of monthly reports; preparation of monthly updates to the technology management system (TMS); and revisions to the peer review implementation guidance and procedures. However, the most important factor in the success of the program has been the implementation of a team approach between the Institute for Regulatory Science (RSI), the American Society of Mechanical Engineers (ASME), and the DOE. FY 2001 was a superb year for the PRP. Highlighted below are some of the accomplishments that occurred during the year:

- Peer Reviews - A total of 140 technology projects were peer reviewed during FY 2001. Currently, over 50 technologies have been identified as potential candidates for peer review during FY 2002.
- Videotape - RSI and the OST CPR joined forces to prepare a videotape outlining the Peer Review Process. The purpose of the videotape is to provide Focus Area and Crosscut Program Managers, and Principal Investigators with an additional tool to prepare for future peer reviews. In addition, it is an excellent mechanism to explain the process to interested stakeholders and the public. The videotape was released on June 20, 2001.
- Training Course - In February, 2001, in an effort to emphasize the importance of the peer review program and provide the OST with an additional understanding of the peer review program, the ASME, RSI, and the CPR joined forces to conduct a Peer Review Training Course in conjunction with the Waste Management Conference in Tucson, Arizona.
- Tracking Systems: The implementation of the peer review module in OST's TMS has been an important tool in identifying OST's potential candidate technologies for peer review. If a technology is funded for a given FY, the TMS automatically identifies the technology as a potential candidate for peer review, therefore alerting the FA managers and providing them with a tool to update the technology's peer review status. The CPR worked closely with HQ to ensure that

all necessary fields were included in the subject peer review module. The system provides important information to interested stakeholders and the public.

The CPR created a Tracking System to monitor FA progress of FY 2000 DOE responses to the reports of the review panel (RP) in regards to the implementation of the RP's recommendations. This system will allow the CPR to prepare a year-end report summarizing the implementation status of the RP recommendations for the preceding year, by the end of the first quarter of each FY.

- DOE Responses - The CPR worked with the OST FA Field and HQ Managers to eliminate the tardiness of the DOE's response to the reports of the RP. All DOE responses are now up to date.

In November 2000, ASME and RSI published the "Assessment of Technologies Supported by the Department of Energy OST - Results of the Peer Review for FY 2000". As part of the report, a set of findings and recommendations were published, which presented the conclusions of the ASME PRC in regards to the peer reviews performed for OST during FY 2000. In September 2001, the CPR prepared for the Deputy Assistant Secretary (DAS), a detailed response to the ASME PRC's findings and recommendations for incorporation into the 2001 ASME Annual Report.

- Reporting - The CPR continues to provide to RSI and OST managers an up to date list of candidate technologies for peer review in the "Monthly Report of the CPR". This allows for timely planning of technology peer reviews during the year. The CPR has made full use of the Center for Risk Excellence (CRE) Home Page by posting all PRP guidance documents and announcing all upcoming peer reviews on the CRE web page.
- Technical Papers - The CPR initiated the process of co-authoring two technical papers related to the PRP. The first paper was presented at the "2001 Waste Management Conference" in Tucson, Arizona and the second paper was presented at the "8th International Conference on Radioactive Waste Management and Environmental Remediation, ICEM' 01".
- Guidance Documents - The CPR is continuously in the process of updating the "DOE/OST's Implementation Guidance for the Technical Peer Review Process". On August 23, 2001, the CPR issued version 4.0 of the guidance. The revised guidance document incorporates a revised set of safety and health peer review core criteria that addresses the concerns of the Environmental Management Advisory Board.
- Grant Renewals - The CPR ensured the renewal of two grants. The Peer Review Program grant provides for a unique and innovative approach to qualifying and mainstreaming innovative environmental technologies. The Best Available

Science grant provides the means to develop and apply methods for assuring that environmental decisions are based on best available science.

Primary CRE Team Participants: Yvette Collazo, CRE; Alan Moghissi, RSI

Technology Development and Deployment Program

The Technology Development and Deployment Program provides for the development, demonstration, and deployment of innovative and commercially available technologies within EM line organizations that accelerate clean-up schedules, reduce costs, or otherwise enhance CH's program effectiveness. EM technologies are evaluated and selected according to criteria, which demonstrate cost savings, shorter schedules, less risk to workers and/or the public, and input from regulators and stakeholders.

The Chicago Operations Office (DOE-CH) Technical Program Officer (TPO) oversees the execution of an integrated approach to technology development and deployment through the development and implementation of appropriate plans, pilot demonstration projects, technology transfer and technology applicability to the ultimate implementation of the technology at the sites managed by DOE-CH. These sites include Ames Laboratory, Argonne National Laboratory East and West, Brookhaven National Laboratory and Princeton Plasma Physics Laboratory.

Chicago Operations Office Plan for Improving the Use of Science and Technology

Responsible for the multi million dollar (\$7.37M) Program for technology development and deployment of innovative technologies for the Chicago Sites environmental restoration and decontamination & decommissioning projects, CH TPO submitted the "Chicago Operations Office Plan for Improving the Use of Science and Technology" to the Assistant Secretary for EM. The plan highlighted Chicago Operations Office significant efforts in integrating science and technology with their operational aspects of cleanup. While Chicago's remaining EM projects are approaching closure (i.e., 2003 for Argonne National Laboratory - East and 2006 for Brookhaven National Laboratory), the CH TPO, in cooperation with CH Site Technology Coordination Group (CH STCG), committed to continue to strive hard in incorporating S&T into our baseline cleanup projects.

In accordance with EM-guidance, the TPO coordinates the Chicago Sites' preparation, execution and documentation of science and technology related life-

cycle-planning data (including communication products such as Site Fact Sheets, Site Maps, Deployment Fact Sheets, etc.) on the following accomplishments:

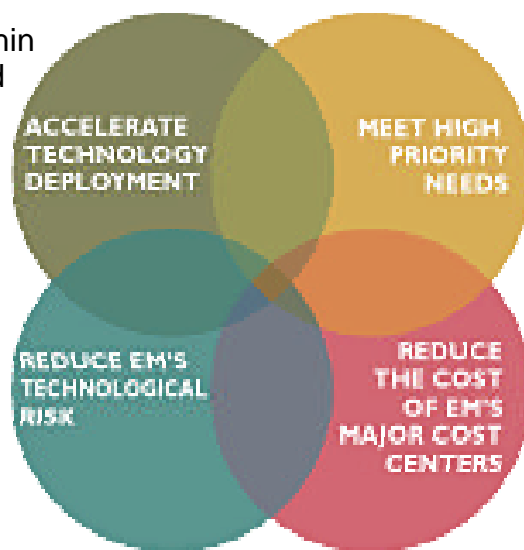
- 13 technology needs incorporated in the IPABS-IS and in the CH-Site Technology Coordination Group Home Page.
- 11 technology deployments incorporated in the IPABS-IS
- 10 technology developments at ANL, Ames, and BNL
- Lessons learned from the deployment activities at BNL
- Deployment Fact Sheet for all historical deployments

Improvement of the CH STCG Communication

Initiated the on-going, which in the near future will be the “One-Stop-Shop” for all of Chicago Sites’ Science and Technology information including Needs, Opportunities, Development, Deployments, and Fact Sheets on innovative technologies used at our sites’ cleanup activities. This Home Page will also be the central location for all EM Guidance documents, new initiatives and Calls for Proposals from the Focus Areas.

Other Initiatives

- Proposal to establish an organization within OST to help provide the scientific and technical basis for safe and secure long-term stewardship, overcome institutional barriers to deployment of new technologies, increase the use of risk-based methods in EM, decrease worker risks from new technologies, and reduce operational risks.
- Collaborative effort with DOE-ID and Idaho National Engineering and Environmental Laboratory in support of the Long-Term Stewardship (LTS) Science and Technology Program.



Primary CRE Team Participants: Miles Dionisio and David Feller, CRE

FY02 GOALS

- Continue to pursue the initiative to establish a “Crosscutting” Program within the OST, which will promote S&T in the following areas:
 - Technology Utilization
 - Stewardship Planning & Technology Needs
 - Risk Science Research Needs
 - Worker Risk

- *Risk Science Coordination*
- *Continue to collaborate with the OST's Focus Areas in providing scientific and technical basis for using risk-based methods in technology development selection.*
- *Incorporate, as standard criteria, risk analysis, in all Accelerated Site Technology Deployment proposals submitted by DOE-CH to OST in order to show that risk reduction can be a metric to demonstrate EM progress and to validate OST investments.*
- *The CH EM and CRE team view implementation of two of the four corporate performance measures for science and technology to be critical to successful closure. Accordingly, CH will continue to **Accelerate Technology Deployment** in order to **Reduce the Cost of EM's Major Cost Centers** within the CH budget. The two remaining corporate performance measures requiring that CH **Meet High Priority Needs** and **Reduce EM's Technological Risk** will be addressed primarily through the CH cutting-edge efforts in Post Closure Stewardship.*

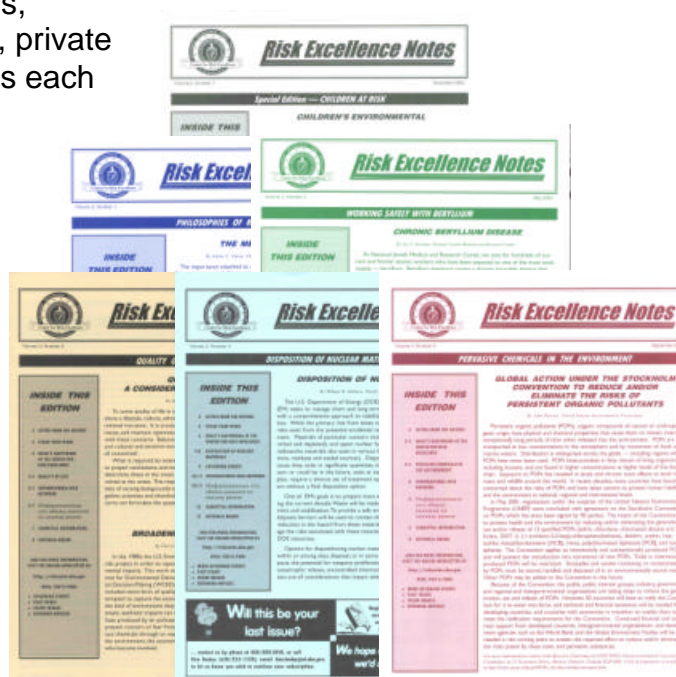
Outreach Activities

“Risk Excellence Notes”

Risk Excellence Notes is the premier publication of the CRE that highlights risk related events, information and activities in the environmental remediation community. Circulation of the bimonthly publication is about 5000 and it is available on-line.

Risk Excellence Notes, first published in June of 1998 is now completing its third year. Its 26 Editorial Board members, selected from DOE, other agencies, private sector and academia, chose to focus each issue on a specific topic during this year. It is a trend that is likely to continue.

Children at Risk, Vol 2-7/
December 2000
Philosophies of Risk, Vol 3-
1/February 2001
Working Safely With Beryllium,
Vol 3-2/May 2001
Quality of Life, Vol 3-3/June
2001
**Disposition of Nuclear
Materials**, Vol 3-4/July 2001
**Pervasive Chemicals in the
Environment**, Vol 3-5/September
2001



- Lane Environmental, as a contractor to PNNL, serves as the primary editor for this publication
- Ames continued to provide support for *Risk Excellence Notes* by representation on the Editorial Board, by soliciting articles for publication, reviewing drafts of articles, and submitting articles for publication.
- PNNL provides an associated editor and authors frequent articles for the publication
- BNL's Dr. Ludmila Shelenkova has provided technical support and outreach to the International Community through the solicitation of technical presentations and their translation into Russian and English.
- Dr. Vitaly Eremenko, UNESCO, Moscow, Russia, is an International Contributing Editor.

Primary CRE Team Participants: Nancy Lane, Lane Environmental; Mary Jo Acke Ramicone, CRE

International Risk Network

Since the end of the Cold War, there has been a growing need for the networking of information and expertise to resolve risk issues associated with the cleanup of the Cold War legacy waste, particularly with and among eastern European nations. Toward this end, the Center for Risk Excellence has been at the center of the effort to establish the International Risk Assessment Network for Cold War Facilities and Environmental Legacies. This informal international risk network was formed to communicate, encourage, and enable the use of western-based risk analysis methodologies in countries of Eastern Europe, and in particular countries of the former Soviet Union. This network was formed by 13 participants at a May 2000 North Atlantic Treaty Organization (NATO) Advanced Study Institute. That institute was entitled "Risk Assessment Activities for Cold War Facilities and Environmental Legacies" and was held in Bourgas, Bulgaria.

The goal of the members of the network are to establish a functional, self-sustaining, risk assessment capability within each participating country to support national decision-making and to secure international financial contributions for cold war environmental legacies of national and international significance. Cold war facilities may include, but are not limited to, former military-industrial complexes producing weapons of mass destruction or sites at which the by-products from these activities were disposed. Environmental legacies of national and international concern may include facilities presenting transboundary pollution problems. Facility and legacy issues to be examined within each country will not encroach on the national security of the participating countries and will not require the use or release of classified or country-sensitive information.

The network is headed by Dr. Alvin L. Young, Center for Risk Excellence, as Director, Mr. Tamas Madarasz, Hungary, Deputy Director. Dr. Vitaly Eremenko, UNESCO, Moscow, Russia is Science Advisor to the

network, and Paul Moskowitz, Brookhaven National Laboratory, is the Technical Secretary. The initial countries represented within the network include Armenia,



Center for Risk Excellence
 International Risk Network

IRN MEMBERS



COUNTRY COORDINATORS					
Olga A. Juharyan, Armenia	Jaroslav Volf, Czech Republic	Tamas Madarasz, Hungary			
Azamat Tynbekov, Kyrgyzstan	Kestutis Kadunas, Lithuania	Petr I. Metreveli, Georgia			
Florin Glodeanu, Romania	Petr L. Gusika, Russia	Ait Esat Karakaya, Turkey			
Georgiy V. Lysychenko, Ukraine	James G. Droppo, USA				
ADMINISTRATORS					
Alvin L. Young, Director	Vitaly A. Eremenko, Science Advisor	Paul D. Moskowitz, Technical Secretary	Tamas Madarasz, Deputy Director		

Bulgaria, Czech Republic, Greece, Hungary, Kyrgyzstan, Lithuania, Georgia, Turkey, Ukraine, Romania, Russia, and the United States.

The accomplishments of the Network during FY2001 include:

- BNL coordinated the travel and the technical participation of 15 International Risk Assessment Network members to the ECO-INFORMA Conference including several keynote addresses, technical papers and posters.
- While at Eco-Informa, BNL and CRE hosted and coordinated the 2nd Meeting of the International Risk Assessment Network. Paul Moskowitz was appointed Technical Secretary to this organization.
- ANL provided a proposal for the design and implementation of an Internet-based Wide-Area Information Exchange Network involving the 13-member countries of the CRE-supported International Risk Assessment Network for Cold War Facilities and Environmental Legacies. The communication network will be used to organize and disseminate risk management methodologies and lessons learned; provide access to top-level expertise and resources among the network countries; and facilitate training and technology/information transfer. Future advances in high-end Internet audio/video capability will enhance both the individual-to-individual and group interactions. The proposed plan was presented in a poster at the Eco-Informa 2001 conference held May 14– 18, 2001, at Argonne.

- BNL prepared a technical report for widespread distribution on “Cold War Environmental Legacies.”

This report presented discussions of Cold War Legacies existing in each of the 13 countries participating in the International Risk Assessment Network and of strategies to reduce the risks to the environment and human health in these countries and international community as a whole.

- BNL established and provided briefings on the International Risk Network with DOE Policy/NN30, EPA Office of International Activities, DOD Deputy Under Secretary for Environmental Security, and State Bureau of Nonproliferation.



- During FY 2001, James Droppo (PNNL) served as the US representative to the Network and serves as PI in a second Advanced Study Workshop proposal to NATO for FY02.

Primary CRE Team Participants: Paul Moskowitz, Brookhaven National Laboratory; James Droppo, Pacific Northwest National Laboratory; Alvin Young, CRE

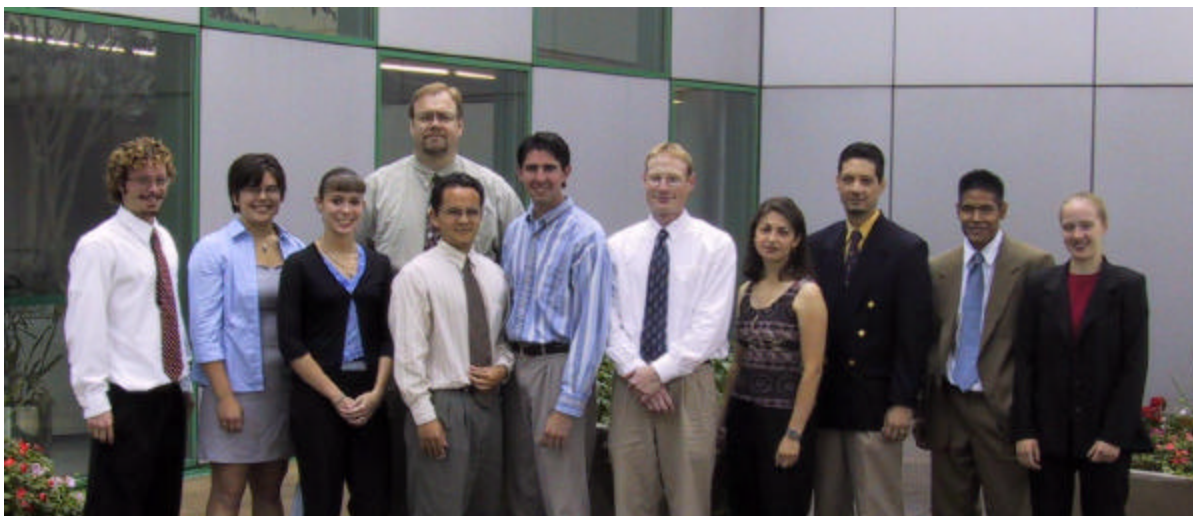
Other International Activities

- AMEC Review. The CRE and ANL's Environmental Assessment Division (ANL/EAD), with the assistance of the Environmental Risk Management Alliance (ERMA), a consortium of six major U.S. universities and Argonne National Laboratory, established a panel of experts to evaluate the document "Final Report of the ATRP-R Project Environmental Security Implications of Decommissioned Russian Nuclear Submarines, Including Dismantlement: Feasibility Study." The evaluation examined the feasibility of conducting an environmental assessment of decommissioned Russian nuclear submarines, including issues related to dismantlement and the technical merit of the material presented. The review panel concluded that this study frames many important issues in the critical area of risk mitigation and environmental security related to nuclear submarines and their facilities. However, a number of gaps exist in the reviewed report that limit its usefulness as a risk assessment scoping study. BNL helped in identifying additional panel members and participated in the review.
- Ecological Reserves in Belarus and Ukraine. The CRE experience with Hanford environmental planning activities was provided by ANL/EAD as input to an interagency meeting hosted by A.D. Little to consider the potential future use of military lands in Belarus and Ukraine as ecological reserves.

Primary CRE Team Participants: Margaret MacDonell and Loren Habegger, Argonne National Laboratory; Paul Moskowitz, Brookhaven National Laboratory

Annual Internship Program

For the last four years, the Center for Risk Excellence (CRE) has had the privilege of sponsoring one of the most active intern programs (for an organization its size) within the Department of Energy. Approximately 15 students have participated each year; this year was no exception, with 17 students participating in the FY2001 Intern Program. Training the next generation of scientists and engineers has been a priority for the Center – the importance of building a future workforce which can understand, communicate, and manage the risks involved cannot be understated.



On July 24th and 25th, the Center for Risk Excellence continued its tradition of sponsoring its annual intern meeting. It consisted of one day of training on risk assessment and communication and a one-day symposium where each intern presented their work to the other interns and their mentors.

Since the Center does not have separate process to select and hire interns, it works through a number of established internship programs to obtain students. These include the Oak Ridge Institute for Science and Education, individual laboratory/Institute programs, and the Institute for Tribal Environmental Professionals. FY2001 interns were as follows:

Name	Mentor	Organization
Ashley Noreuil	Martin Edelson	Ames Laboratory
Melanie Torrie	Martin Edelson	Ames Laboratory
Hope Didier	Margaret MacDonell	Argonne National Laboratory
Patricia Lasley	Margaret MacDonell	Argonne National Laboratory
Nohemi Melero	Margaret Tolbert	Argonne National Laboratory
David D. Smith	Thomas Yule	Argonne National Laboratory
Geoff Warren	Margaret MacDonell	Argonne National Laboratory
Kim Buday	Alvin Young	Center for Risk Excellence
Luis Maldonado-Santini	Peter Siebach	Center for Risk Excellence
Heather Svejcar	Alvin Young/Paul Moskowitz	Center for Risk Excellence/ Brookhaven National Laboratory
Adam Babcock	Mervyn Tano	International Institute for Indigenous Resource Management
Kawika Malama	Mervyn Tano	International Institute for Indigenous Resource Management
Christian Palmer	Mervyn Tano	International Institute for Indigenous Resource Management
Peter Exline	William Andrews	Pacific Northwest National

		Laboratory
Nathan Smith	William Andrews/ Robert Stenner	Pacific Northwest National Laboratory
Dennis Soldat	William Andrews	Pacific Northwest National Laboratory
Andrea Old Coyote	Regina Hunter	Sandia National Laboratory

Primary CRE Team Participants: See above Table

Surveys

The Ames Laboratory and Iowa State University (ISU) have been actively involved in the conduct of surveys at Rocky Flats Environmental Technology Site (RFETS). Survey results directed towards understanding how to determine a cleanup endpoint that optimally balances risk between stakeholders, workers, and DOE were collected from community and DOE staff at RFETS. A survey tool for workers was approved by the ISU and RFETS Institutional Review Boards and the US Steelworker Union Local President. The worker survey will be conducted early in FY02.

Primary CRE Team Participants: Martin Edelson, Ames Laboratory

CRE Web site

Argonne continued to update and enhance the CRE web site and respond to related information requests. The Web site contains links to categories of information on:

- “What is Risk?” -- risk-related resources on the Web that have some basic information about the term "risk";
- “Programs and Services” – information about the Center including personnel, supporting organizations, and programs and projects sponsored.
- “Technical Information” – links to risk-related technical documents and other information produced by the Center and others.



- “Information Exchange” – provides a forum for exchange between the Center and associated groups and individuals
- “Newsletter” – Postings of the Center’s Risk Excellence Notes newsletter
- “Calendar” – listing risk-related conferences and workshops; and
- “Risk Web Sites” – providing links to other risk-related web sites, including those of the associated groups

Primary CRE Team Participants: James Butler, Argonne National Laboratory

Factsheets

Thirty-four (34) Contaminant Fact Sheets: Argonne National Laboratory has developed summary fact sheets jointly for the U.S. Department of Energy (DOE) Richland Operations Office and the DOE Center for Risk Excellence. These fact sheets provide health-related information for selected contaminants found at many DOE environmental management sites. The fact sheets are geared toward an

Radioactive Properties of Key Cobalt Isotopes

Isotope	Half-Life	Specific Activity (Ci/g)	Decay Mode	Radiation Energy (MeV)		
				Alpha (a)	Beta (b)	Gamma (g)
Co-57	270 days	8,600	EC	-	0.019	0.13
Co-60	5.3 yr	1,100	β	-	0.097	2.5

EC = electron capture, Ci = curie, g = gram, and MeV = million electron volts; a dash means the entry is not applicable. (See the companion fact sheet on Radioactive Properties, Internal Distribution, and Risk Coefficients for an explanation of terms and interpretation of radiation energies.) Values are given to two significant figures.

audience familiar with basic risk concepts, and their intent is to provide overview context to support health risk analyses.

Radiological Risk Coefficients

This table provides selected risk coefficients for inhalation and ingestion. Recommended default absorption types were used for inhalation, and dietary values were used for ingestion. Risks are for lifetime cancer mortality per unit intake (pCi), averaged over all ages and both genders (10^{-9} is a billionth, and 10^{-12} is a trillionth). Other values, including for morbidity, are also available. (See text at left for information on the main pathway, external exposure.)

Isotope	Lifetime Cancer Mortality Risk	
	Inhalation (pCi^{-1})	Ingestion (pCi^{-1})
Cobalt-57	1.7×10^{-12}	9.0×10^{-13}
Cobalt-60	3.0×10^{-11}	1.4×10^{-11}

For more information, see the companion fact sheet on Radioactive Properties, Internal Distribution, and Risk Coefficients.

Primary CRE Team Participants: John Peterson, Margaret MacDonell, Lynne Haroun, Don Dunning, Russ Brown, Fred Monette, and Geoff Warren, Argonne National Laboratory

Native American Initiatives

The purpose of the CRE Native American Initiative is to address how DOE cleanup decisions and activities affect tribes and tribal resources, as well as other cultural concerns. Through a variety of partnerships, CRE has supported and been active in the development of a tribal Natural Resource Curriculum for Land-Grant Institutions (Tribal Colleges), sponsored an internship program, and co-sponsored several workshops that emphasized Native American issues within the context of DOE cleanup activities.

Natural Resources Curriculum Development for Land-Grant Institutions (Tribal Colleges)

- CRE is the liaison between tribal leaders, scientists, and federal government representatives to develop, shape, and define a planning model for Natural Resources Curriculum for consideration by Tribal colleges and universities.
- CRE is supporting the development of a series of articles on tribal natural resource curriculum development
- CRE supported the Nez Perce program for science and math excellence in the Native American high school student community.

CRE Internship Program

- Larry Lapachin, an intern at International Institute for Indigenous Resource Management (IIIRM), contributed research to the development of the quality of life methodology project and a tribal decision-makers technology matrix
- Kawika Malama, an intern at IIIRM, is researching the history of tribal involvement with the Department of Energy's Office of Environmental Management (EM)
- Christian Palmer, an intern at IIIRM, examined early written reports and oral histories of Hawaiian culture and their resource management strategies
- Adam Babcock, an intern for IIIRM, is researching the Osage Mourning Ceremony and its link to increased cultural risks
- Nathan Smith, an intern at Pacific Northwest National Laboratory (PNNL), is contributing economic research to the quality of life methodology framework

CRE-sponsored Workshops

- *The Application of Remote Sensing and GIS to Federal Facilities Environmental Restoration* discussed how the application of geographical information systems (GIS) influences DOE cleanup and impacts tribes (November 1 – 2, 2000, Lakewood, CO)
- *Federal Indian Trust Obligation, Treaties, Agency Policy and Indian Law on Federal Facilities Cleanup in Indian Country* provided an overview the Federal Indian Trust obligation, agency Indian policies, and Indian law as it influences and applies to Federal Facilities cleanup in Indian Country (November 28 – 29, 2000, Lakewood, CO)
- *Tribal Issues and Opportunities Related to the Long-Term Stewardship of Contaminated Federal Facilities* identified a wide range of tribal concerns and opportunities related to the long-term stewardship of DOE sites (March 14 – 15, 2001, Lakewood, CO)

Primary CRE Team Participants: Robert Stenner, Pacific Northwest National Laboratory; Larry Lapachin and Alvin Young, CRE

Hispanic Employment Program

- National HEPM Advisory Council (NHEPMAC) Semiannual Meeting - The HEPM hosted the NHEPMAC's semi-annual meeting on September 27-29, in Chicago, IL. A total of 12 DOE organizations and/or field offices were represented at the meeting. A second semiannual meeting took place on July 25-26, 2001 in Washington, DC.
- Web Site/Skills Bank Development - Under the direction of the HEPM, a web site was developed for the NHEPMAC. The web site contains a skills bank database, which provides managers with a tool to find qualified Hispanics for different job positions. Both, the web site and the skill bank are currently being finalized.

- Brochure Development - Under the direction of the HEPM, a color brochure was developed for the NHEPMAC.
- Summer Interns - The HEPM identified three Hispanic summer interns to participate in the CRE's Summer Internship Program.
- Hispanic Heritage Month - The HEPM organized all activities related to the Hispanic Heritage month for the Chicago Operations Office. The activities included a guest speaker, dance group, weekly Hispanic lunches, etc.).
- CY 2002 Program Plan and Other Documents of Interest - Under the direction of the HEPM, the NHEPMAC issued its first Program Plan to the Secretary of Energy, which outlines the role of the NHEPMAC and its activities for the FY. In addition, the NHEPMAC's charter and by-laws were revised and brought up to date.
- Conferences - In September 2000, the HEPM participated in the US Hispanic Leadership Conference held at the McCormick Place in Chicago, IL. The DOE is a sponsor of the conference.

Primary CRE Team Participants: Yvette Collazo, CRE

International Conferences

ECO-INFORMA

Eco-Informa 2001 "Environmental Risks and the Global Community: Strategies for Meeting the Challenges" conference held May 14 - 18 at Argonne National Laboratory.



Nobel Laureate Sherwood Rowland addresses Eco-Informa 2001 on "Earth's atmosphere in the 21st century."

More than 200 scientists from two dozen countries attended Eco-Informa 2001, which was co-hosted by the Center for Risk Excellence and Argonne's Environmental Assessment Division.

The conference highlighted opportunities in four areas: sustainable environment, engineering and biotechnology, public policy and due process, and environmental

information in the 21st century. Participants were asked to highlight recommendations and the outlook for the future within a variety of topics. Current risk issues addressed ranged from cleanup of Cold War legacy sites and dealing with the energy crisis to food safety. Transboundary transport of persistent organic pollutants (POPs) and global climate change were also discussed, as were better ways to predict and manage impacts of urbanization on our environmental resources. Several innovative approaches to examining these areas were highlighted at the conference. Included were novel ways for integrating such tools as information technology and Internet applications with geographic information systems and remote sensing, as well as environmental partnerships and communication.

All of the Center's Teams participated in Eco Informa through giving oral and poster presentations, organizing and chairing sessions, logistical support, and hosting international guests.

Other Conferences

The Center for Risk Excellence also participated and co-sponsored the "International Symposium on Health Risk Communication: Uncertainty, Stakeholders, and Public Health Action", November 1-3, 2000, Bethesda, MD. The symposium addressed both the American experience and the experiences of developing nations and nations in transition in communicating environmental, occupational, and public health risks. The presentations reflected the growing needs of effective risk communication, openness and public involvement in our society. The center is involved in the publishing of the symposium proceedings.

Primary CRE Team Participants: Margaret MacDonell, Argonne National Laboratory; Alvin Young and Mary Jo Acke Ramicone, CRE, Maria Pavlova, EH-6

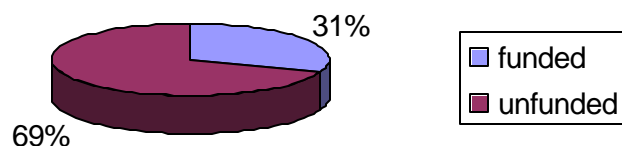
CRE Administrative Performance

New Business Development

Each year the Center strives to develop new customers for its work and to leverage its' funding to gain further support. The following graphics reveal our significant efforts and success for FY01.

New Business Initiatives

(total of 13 proposals)



New Business v. Base

Funding (1,000's)



Activity Level

As an indicator of the type and level of CRE activity, data were collected in a series of categories. Clearly, the Center maintained a vigorous program in FY2001.

Site Visits	17
Conferences/Special Meetings Attended	76
HQ/ Field Briefings on CRE Work	17
Conference Calls	18
Issue of Risk Excellence Notes	7
International Risk Assessment Network Activities	12
CRE Sponsored/Co-Sponsored Events	42
Training Courses (Sponsored)	7
Proposals Developed	13
Peer Review Activity	62
Other Events/Activities	9

Publications/Presentations

Presentations

Andrews, William B., PE, John W. Buck, Dr. B L Hall, Garriann Gelston, Randal Taira. "Long Term Stewardship: Integrated Management of Residual Hazards and Real Assets". Pacific Northwest National Laboratory. Presented at Eco-Informa 2001, Environmental Risks and the Global Community: Strategies for Meeting the Challenges, May 16, 2001

Bollinger, M.E. "Overview of the DOE Center for Risk Excellence". Speech to the American Nuclear Society imbedded topical meeting on Energy Facility Contractors Group, June 2001.

Brown, R. A. "New Statistical and Visualization Methods for Detection of National Cancer Mortality Patterns", ECO-INFORMA Meeting, May, 2001.

Brown, R. A. "Technical, Regulatory, and Environmental Characteristics of a Confined Animal Feeding Operation", ECO-INFORMA Meeting, May, 2001.

Butler, J., M. MacDonell, and Y.S. Chang, 2000, "Addressing Aggregate Exposures for Cumulative Health Risk Assessments", presented at the Society for Risk Analysis Annual Meeting, Arlington, VA, Dec.

Church, B.W., "Environmental Remedial Action – Are We Doing More Harm than Good?" presented at the 2001 Waste Management Conference, Tucson, AZ.

Collazo, Y.T., A.L. Taboas, A.A. Moghissi, "An Independent Peer Review Process for Environmental Technology" - Presented at the 8th International Conference on Environmental Management, ICEM'01 at Bruges, Belgium, September 2001.

Collazo, Y.T. , C.O. Velzy, G.A. Benda, and A.A. Moghissi, "Independent Peer Review of DOE Technologies" - Presented at the Waste Management Conference in Tucson Arizona, February, 2001.

Edelson, M.C., Morris, S.C., Daisey, J.M., "Worker Safety and Health Issues Associated with the DOE Environmental Cleanup Program: Insights from the DOE Laboratory Directors' Environmental and Occupational/Public Health Standards Steering Group", presented at the 2001 Waste Management Conference, Tucson, AZ.

Elcock, D. Presentation made and paper published at International Conference on Waste Management (Hong Kong, 10/00).

Elcock, D. Paper to be presented at ICEM Conference (Belgium, 10/01).

Gusika, P.L., Shilova, O.V., Janovskaja, N.S., Eremenko, V.A., Andrews, W.B., Bley, D.C., Droppo, J.G., 2001 "The International Risk Network: Enabling Risk Application Opportunities in Russia." Presented at Eco-Informa 2001, Environmental Risks and the Global Community: Strategies for Meeting the Challenges, May 16, 2001, PNNL-SA-34900.

Habegger, L., A. Young, R. Johnson, M. MacDonell, G. P. Williams, Wide-Area Information Exchange Network to Support the International Risk Assessment Network, (poster) presented at the international conference Eco-Informa 2001, Argonne, IL, May.

Habegger, L. and M. MacDonell, 2001, "Integrating Risk Science into the Stewardship Science and Technology Roadmap", DOE Long-Term Stewardship Workshop, Grand Junction, CO, Aug.

Hocking, E.K., "Intergenerational Equity and Environmental Restoration Cleanup Levels", presented at the 2001 Waste Management Conference, Tucson, AZ.

Kenoyer, J.L., W.B. Andrews, and R.D. Stenner. 2001. "MONITORING AND PREDICTING WORKER RISK" - presented at the 2001 Waste Management Conference, Tucson, AZ.

Linkov, I., J. Palma-Oliviera, J. Shatkin, and M. MacDonell, 2000, "Assessment and Management of Environmental Risks in Eastern European and Developing Countries", presented at the Society for Risk Analysis Annual Meeting, Arlington, VA, Dec.

MacDonell, M., A. Bunn, and D. Hildebrand, 2000, "Integrated Assessment of Risks and Impacts to Guide Site Cleanup Plans", presented at the Society for Risk Analysis Annual Meeting, Arlington, VA, Dec.

MacDonell, M., F. Monette, I. Hlohowskyj, K. Picel, and L. Haroun, 2000, "Shared Communication of Risk Information for Native American Environmental Monitoring Programs", presented at the Society for Risk Analysis Annual Meeting, Arlington, VA, Dec.



MacDonell, M., J. Peterson, K. Picel, L. Habegger, 2001, "Assessment of Cumulative Risks and Mixtures at a Cleanup Site", (poster) presented at the NIEHS Mixtures Conference, Colorado State University, Ft. Collins, CO, Jan.

MacDonell, M., J. Peterson, F. Monette, and M. Picel, 2001, "Cleanup Decisions that Acknowledge Multiple Risks", presented at the DOE Waste Management '01 Conference, Tucson, AZ, March.

MacDonell, M. and R. Hertzberg, 2001, "Implementing a Mixtures Risk Assessment at a Cleanup Site", (invited) presented at the annual DoD/EPA Toxicology and Risk Assessment Conference, Dayton, OH, April

MacDonell, M., Z. Schreiber, and R. Hertzberg, 2000, "Integrated Risk Assessment for Chemical Mixtures", (invited) presented at the NATO Advanced Research Workshop on Assessment and Management of Environmental Risks: Methods and Applications in Eastern European and Developing Countries, Lisbon, Portugal, Oct.

MacDonell, M. and R. Hertzberg, 2000, "Preliminary Application of EPA's Mixtures Guidance at a DOE Cleanup Site", presented at the Society for Risk Analysis Annual Meeting, Arlington, VA, Dec.

MacDonell, M., 2001, "Risk-Based Approaches for DOE Cleanup", (invited) presented at the interagency Range Reuse Meeting, Boston, MA, June.

McCabe, B., Lippy, B., "Long-Term Stewardship of the DOE Workforce: Integrating Safety and Health into the Design and Development of DOE Clean-up Technologies", presented at the 2001 Waste Management Conference, Tucson, AZ.

McGinn, C.W., Moyer, J.H., Bloom, L.D., "Integrated Worker Risk Evaluation System", presented at the 2001 Waste Management Conference, Tucson, AZ.

Ramos, R., R. Myshkowec, M. Shanafield, Z. Schreiber, and M. MacDonell, 2001, "Conceptual Models for Integrated Cumulative Risk Assessment", (poster) presented at the international conference Eco-Informa 2001, Argonne, IL, May.

Sackschewsky, Michael R. , Spyridon Tzemos, and Gordon R. Bilyard. "EQPT: A GIS-Based Tool for Assessing Environmental Quality". Pacific Northwest National Laboratory, Richland, WA. Presented at Eco-Informa 2001, Environmental Risks and the Global Community: Strategies for Meeting the Challenges, May 16, 2001

Simmons, S. "Alternative Remediation Applications" Eco-Informa Conference, May 13-18, 2001. Presented Thursday, 5/17. Please note: the outline that appears in the original program is not the abstract. If you cannot locate the original abstract we distributed at the conference (for your records) we will be happy to provide one for you.

Simmons, S. "Native American Natural Resource Management Interactive Wheel" IIIRM Annual Conference. Presented for Dr. Alvin Young, Merv Tano, David Archambault as a model for intra and interworkings between tribes, natural resource managers, and government agencies.

Simmons, S. "Indigenous Natural Resource Curriculum: A Bachelor's Program for the AIHEC Institutions" Submitted April 30, 2001.

Stenner, R.D., K.L. Soldat, C. Timchalk, K.D. Thrall, J.C. McDonald, and D.J. Strom. 2001. "Exposure to Dose Research Focus of an Environmental Health Program" Pacific Northwest National Laboratory operated by Battelle Memorial Institute - presented at the CRE sponsored 2001 Ecolnforma Conference, Argonne, IL

Stenner, R.D. 2001. "Quality of Life Perspective & Approach." Presentation at the April 2001 ASTM sponsored Quality of Life Meeting in Phoenix, AZ.

Sullivan, T.M., Moskowitz, P.D., and Young, A.L., "Risk Assessment as a Decision Tool," Workshop on Black Sea and Central Asian Energy Related Environmental Issues and Technology Solutions, Lawrence Livermore National Laboratory, August 8-10, 2001.

Travis, C.C., Young, A.L., Dionisio, M.C., "Worker Risk as a Factor in Technology Selection", Waste Management 01, 2001.

Travis, C.C., "An Overview of Risk Assessment", NATO Advanced Research Workshop, Bialystok, Poland, May 8-11. 2001.

Travis, C.C. "Sustainable Development", Ecolnforma, May 15, 2001.

Organizing Committee Member (M. MacDonell), International Conference on Environmental Informatics 2001. Participated in program discussions with other organizing committee members from February through September; invited to serve as session chair and panel member at upcoming conference.

Methods Working Group Co-Chair (M. MacDonell), NATO Advanced Risk Workshop. Led discussions of 19 scientists from 12 countries on environmental assessment methods at the NATO Advanced Risk Workshop in Lisbon in October and prepared a report summarized in SRA's National Newsletter and being published this year.

NATO Country Scientist Group Member (M. MacDonell), NATO Science for Peace Subprogramme. Participated in the June meeting and provided input to the September project plan for reuse of military sites in Belarus and Ukraine.

Invited Participant (M. MacDonell), National Environmental Policy Commission, Chicago meeting. Attended the April meeting per a request from the Department of Justice organizer, to coordinate input on cumulative risks.

Invited Participant (M. MacDonell), National Academy of Sciences, National Research Council, Project Planning Meeting for Cumulative Risk Assessment and Human Health. Participated in the October meeting and in subsequent related discussions with EPA in January, May, and August.

Publications

Acke-Ramicone, M.J., Lane, N. "How the U.S. Department of Energy's Environmental Management Program Communicates with its Stakeholders". Environ. Sci. & Pollut. Res., Special Issue 2: 65-70.

Andrews, W.B. and RD Stenner. "Risk Management - An Insurance Policy for Site Cleanups", Environmental Updates - Highlights of Battelle's International Environmental Leadership. Battelle Memorial Institute, Columbus Ohio. Summer 2001, page 2.

Bishop, W.E., D, P. Clarke, and C. C. Travis, "The Genomic Revolution: What Does It Mean for Risk Assessment?" Journal of Risk Analysis, In Press.

Bollinger, M.E., Stenner, R., Picel, K., McGinn, W. "Communicating Risks from the Environmental Management Program of the United States Department of Energy". Environ. Sci. & Pollut. Res., Special Issue 2: 71-78.

Chen, S.Y., 2000. "Radiation Protection Framework for Release of Scrap Materials Containing Residual Radionuclides." Environ.Sci.& Pollut. Res. Special Issue 2: 29-35.

Church, B.W. "The Unacknowledged Transfer of Risk". Environ. Sci. & Pollut. Res., Special Issue 2: 71-78.

Droppo, J G, D C. Bley, V.A. Eremenko, editors, 2001 "Risk Methodologies for Technological Legacies," NATO ASI Series Textbook (in press).

Elcock, D. Paper submitted to International Journal for Environmental Management and Technology (7/01)

Habegger, L. and M. MacDonell, 2001, "Toward Improved Environmental Decisions", in Risk-Based Decision-Making in Water Resources IX, Y. Haimes, D. Moser, and E. Stakhiv (eds.), Proceedings of the 9th Engineering Foundation Conference held in Santa Barbara, CA, in Oct. 2000, published by American Society of Civil Engineers, Reston, VA, Sept. (book).

Harris, S.G., Harper, B.L. "Using Eco-Cultural Dependency Webs in Risk Assessment and Characterization of Risks to Tribal Health and Cultures". Environ. Sci. & Pollut. Res., Special Issue 2: 91-100

Hocking, E.K, Bendowitz, C.L., and Flynn, M., 2000. "Cultural Impact Assessments and Environmental Remediation Decisionmaking." *Environ.Sci.& Pollut. Res. Special Issue* 2: 85-90.

Hocking, E.K., "Intergenerational Equity and Environmental Restoration Cleanup Levels", Waste Management 01, Tucson, AZ, 27 February 2001. (paper printed in conference proceedings)

MacDonell, M., 2001, "Preventing Unnecessary Risks for Cleanup Workers", *Environ. Sci. & Pollut. Res.*, accepted Sept. (for Nov. journal publication).

MacDonell, M., H. Hartmann, J. Peterson, F. Monette, and M. Picel, 2001, "Incorporating Worker Risk Information into Cleanup Decisions for Contaminated Sites", *Environ. Sci. & Pollut. Res.*, invited paper, submitted Sept. (accepted, per material previously submitted and peer reviewed, for Nov. journal publication).

MacDonell, M., 2001, "Integrated Risk Assessment of Chemical Mixtures, in Assessment and Management of Environmental Risks", I. Linkov and J. Palma-Oliveira, eds., Kluwer Academic Publishers, Boston, MA (book, in press).

MacDonell, M. and I. Holoubek, 2001, "Methods and Tools for Assessment and Management of Environmental Risks", in Assessment and Management of Environmental Risks, I. Linkov and J. Palma-Oliveira, eds., Kluwer Academic Publishers, Boston, MA (book, in press).

MacDonell, M. and L. Habegger, 2000, "Integrated Risk and Impact Assessments for Complex Contaminated Sites", *Environ. Sci. & Pollut. Res.*, 2:13-20.

MacDonell, M., J. Peterson, G. Klemic, D. Elcock, F. Monette, and K. Picel, 2000, "Integrated Risk and Impact Assessments for Complex Contaminated Sites", *Environ. Sci. & Pollut. Res.*, 2:21-28.

MacDonell, M. and A.L. Young. 2000. "Facing the Environmental Risk Issues of the Cold War" Commentary, *Environ. Sci. & Pollut. Res.*, Special Issue 2: 5-6.

Peterson, J., M., MacDonell, T. Longo, J. Harvill, and P. Drez, 2001, "Volume and Activity of Buried Transuranic-Contaminated Wastes at U.S. Department of Energy Facilities", *Health Physics*, accepted Aug. (for Dec. journal publication).

Peterson, J., M. MacDonell, L. Haroun, D. Dunning, R. Brown, F. Monette, G. Warren, 2001, Summary Fact Sheets for Selected Environmental Contaminants to Support Health Risk Analyses, prepared for DOE-Richland and DOE Center for Risk Excellence, Sept.

Regens, J.L., K.R. Obenshain, C.C. Travis, and C. Whipple, "Conceptual Site Models and Multimedia Modeling: Comparing MEPAS, MMSOILS, and RESRAD". Health and Ecological Risk Assessment, In Press.

Regens, J.L., Wilkey, P.L., Zimmerman R.E., Hodges D.G., Mohr L.C., Fleming, G., 2000. "A Risk-Based Approach to Setting an Environmental Management Science and Technology Agenda for the U.S. Department of Energy's Nuclear Weapons Complex". Environ. Sci. & Pollut. Res., Special Issue 2: 45-48.

Regens, J.L., Zimmerman, R.E., Wilkey, P.L., Hodges, D.G., Armstrong, A.Q., Kelley, L. "Evaluating Environmental Technology for Meeting Remediation End Points and Long-Term Stewardship Options". Environ. Sci. & Pollut. Res., Special Issue 2: 49-56.

Shelenkova, L., Moskowitz, P., Svejcara, H. 2001. "Cold War Environmental Legacies". Brookhaven National Laboratory, Upton, NY

Siebach, P.R., Daling, P.M., Ross, S.B., Biwer, B.M. "Evaluation of Alternative Configurations for Shipping Low-Level Radioactive Waste to the Nevada Test Site". Environ. Sci. & Pollut. Res., Special Issue 2: 49-56.

Simmons, S. "Quality of Life as a Consideration in Risk Assessment" Risk Excellence Notes, June 2001, Vol. 3 Number 3

Simmons, S. "Mercury/Methylmercury Contamination and Remediation" Risk Excellence Notes, originally submitted for Oct. 2001, will be pushed back to January 2002.

Smith, NL and RD Stenner. 2001. "Standard Guide for Quality of Life Economic Forecasting" A draft Standard Guide for consideration by the ASTM Sub-Committee on Risk Management in Decision Making (E47.14).

Stenner, RD (PNNL), DL Strenge (PNNL), LH Staven (PNNL), GV Klipa (DOE-SR-PMMG), RE Hottel (WSRC), CL Martin (WSRC), R Saylor (WSRC/SPID), G Becker (WSRC/SPID), L Borghi (SAIC), P Siebach (CRE). 2001. INTERNAL DRAFT - "Plutonium-239 Prototype Nuclear Material Relative Hazard Profile." CRE White Paper Report to DOE Office of Nuclear Material and Spent Fuel(EH-21)and DOE Plutonium Materials Management Group (PMMG).

Taboas, A.L., Collazo Y.T., and Fellhauer, C.. 2000. "Decommissioning the World's Premier Facility for Radiological Research: The Janus Reactor". Technology. Vol. 7: 577-590.

Travis, C.C., A.L. Young, M.C. Dionisio, "Science and Technology Challenges for the Environmental Cleanup of the Cold War Legacy". Environmental Science and Pollution Research , Special Issue 2, 37-44 (2000).

Travis, C.C., K.R. Obenshain, J.L.Regans, and C. Whipple, "Limitations of Multimedia Models for Use in Environmental Decision Making". *Environmental Monitoring and Assessment*, 71, 51-60 (2001).

Travis, C.C., "Risk Analysis: An Overview of Endocrine Disruptors and Cancer Risk Assessment", NATO Press, (2001)

Travis, C.C., A.L. Young, M.C. Dionisio, "Worker Risk as a Factor in Technology Selection", *Proceedings Waste Management* 01, (2001).

Travis, C.C., A.L. Young, M.C. Dionisio, "Worker Risk as a Factor in Technology", *Environmental Science and Pollution Research*, Special Issue, In Press.

Travis, C.C., "An Overview of Risk Assessment", *Folia Histochemica et Cytobiologica*, In Press.

Travis, C.C., Young, A.L., and M.C. Dionisio. 2000. "Science and Technology Challenges for the Environmental Cleanup of the Cold War Legacy". *Environ. Sci. & Pollut. Res.*, Special Issue 2: 37-43.

Young, A.L. 2001. "Operational Use of Herbicides in Vietnam", 1962-1971. *In: Organohalogen Compounds*. Yang, J.H. (Editor), Catholic University of Daegu, Korea. 54: 384-387

Young, A.L. 2000. "Meeting the Environmental Risk Challenge of the Cold War". *Environ. Sci. & Pollut. Res.* Special Issue 2: 1-2.

Young, A.L. and W.B. Andrews. 2000. "The Status and Challenges of Managing Risks in the United States Department of Energy's Environmental Management Program". *Environ. Sci. & Pollut. Res.*, Special Issue 2: 7-12.

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